

 **commodore**


**service  
information**

# Commodore Computer

## Technical Manual

Model SX-64

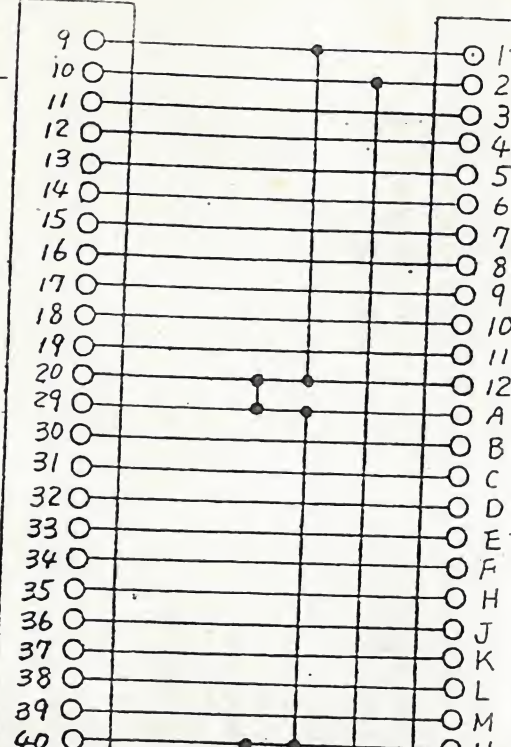
These documents are for repair service information only. Part numbers are for reference only. Only parts on current dealer parts list are available. No license is given for any use by possession of these documents and may not be reproduced in any form without the written approval of Commodore Electronics Limited.

 **commodore**  
COMPUTER



P7

GND  
DC.5V  
RESET  
CNT1  
SP1  
CNT2  
SP2  
PC2  
ATN  
AC9V  
AC9V  
GND  
GND  
FLAG2  
PB0  
PB1  
PB2  
PB3  
PB4  
PB5  
PB6  
PB7  
PA2  
GND

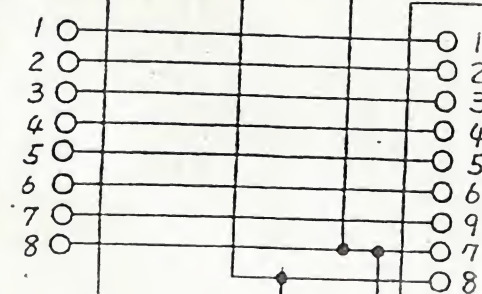


P6

USERS PORT

(COMPONENT SIDE)  
1 2 3 4 5 6 7 8 9 10 11 12  
A B C D E F G H J K L M N  
(SOLDER SIDE)  
24P Edge Connector

ROW0/JOY A0  
ROW1/JOY A1  
ROW2/JOY A2  
ROW3/JOY A3  
POT AY  
ROW4/LP  
POT AX  
VCC

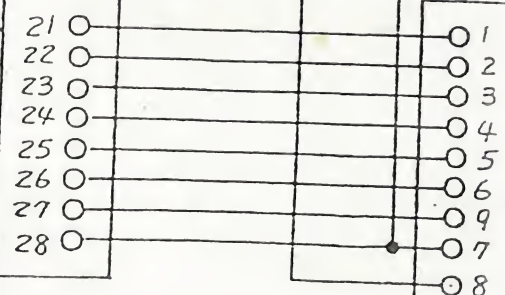


P3

CONTROL PORT 1

9P D-SUB Connector

CSL0/JOY B0  
CSL1/JOY B1  
CSL2/JOY B2  
CSL3/JOY B3  
POT BY  
CSL4/BTN B  
POT BY  
VCC



P2

CONTROL PORT 2

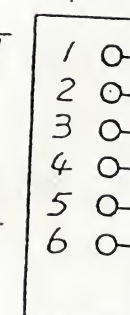
9P D-SUB Connector

CONNECTOR PCB

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	10-27-83	J. Migo

J11  
SRQ IN  
GND  
ATN  
CLK  
DATA  
RESET

MOLEX 5102-06



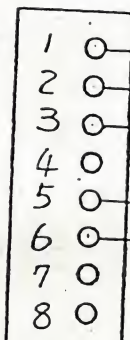
BRN  
RED  
ORG  
YEL  
BLE  
PUR

J5

6P DIN CONNECTOR  
TCS4460-01-101  
External Serial  
BUS

J16  
SYNC/LUM  
GND  
AUDIO  
NC  
AUDIO IN  
COLOR  
NC  
NC

MOLEX 5102-08



BRN  
RED  
ORG  
BLE  
PUR

J4

8P DIN CONNECTOR  
TCS4490-1011  
External Monitor

SOLDERING

CONNECTOR PCB

Wier Material  
AWG26

AWM1007 VW-1

UNLESS OTHERWISE SPECIFIED TOLERANCES ON DECIMALS		DRAWN BY: J. Migo	DATE: 7.13.83	commodore	
X	XX	CHKD: CHAGISAYA	8/16/83		
XXX	XXX	ENGR: J. Migo	8-16-83		
XXX	XXX	APPR: J. Migo	10-27-83		
MATERIAL		USED ON	NEXT ASSY	SCHEMATIC, CONNECTOR, PCB ASSY	
FINISH		SX-64	250674	SIZE B	250421
				SCALE NONE	SHEET 1 OF 1



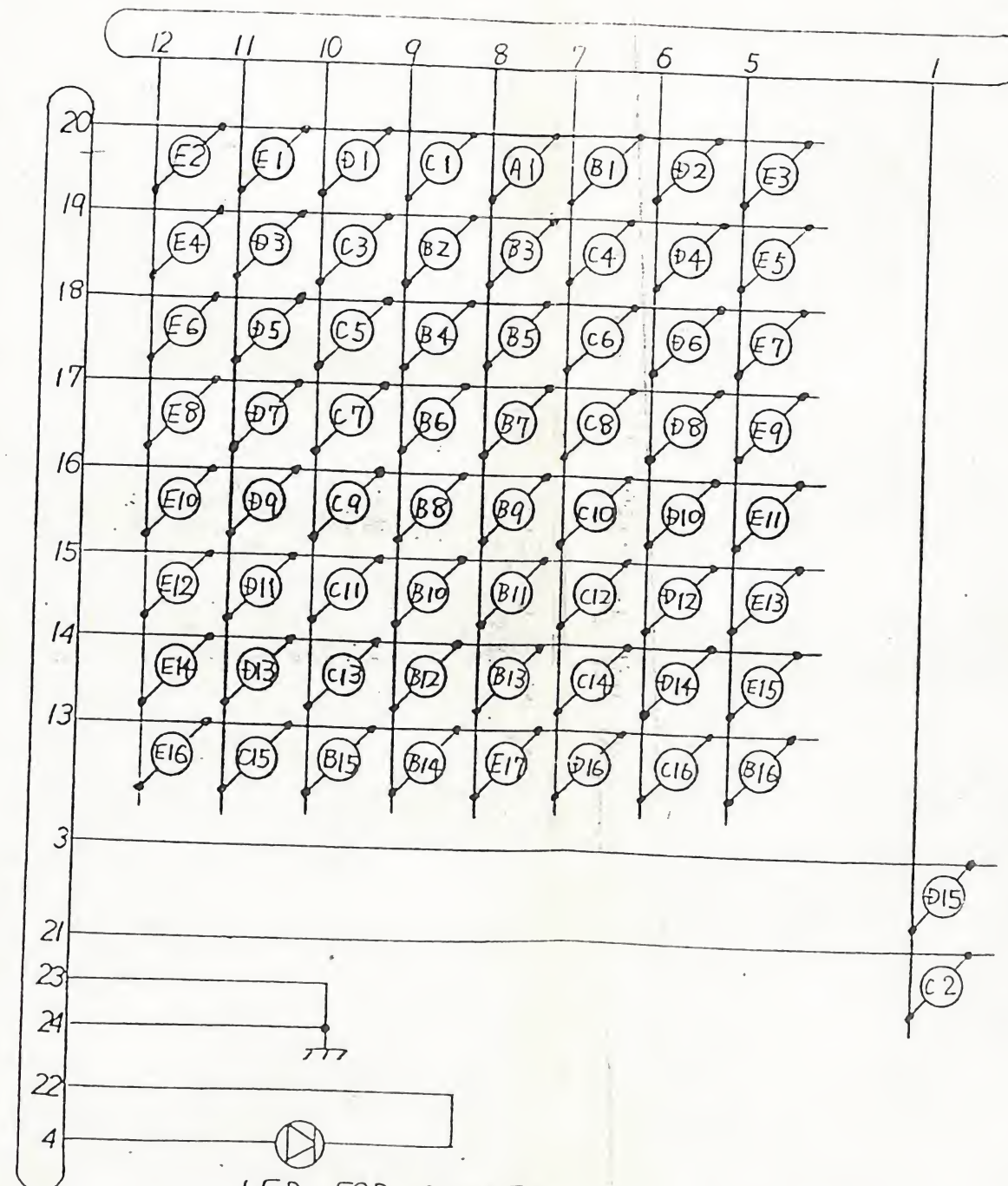
LTR ZONE

# REVISIONS

DESCRIPTION

DATE APPROVED

SEE SHEET



LED FOR C2 KEY

## SCHEMATIC

commodore

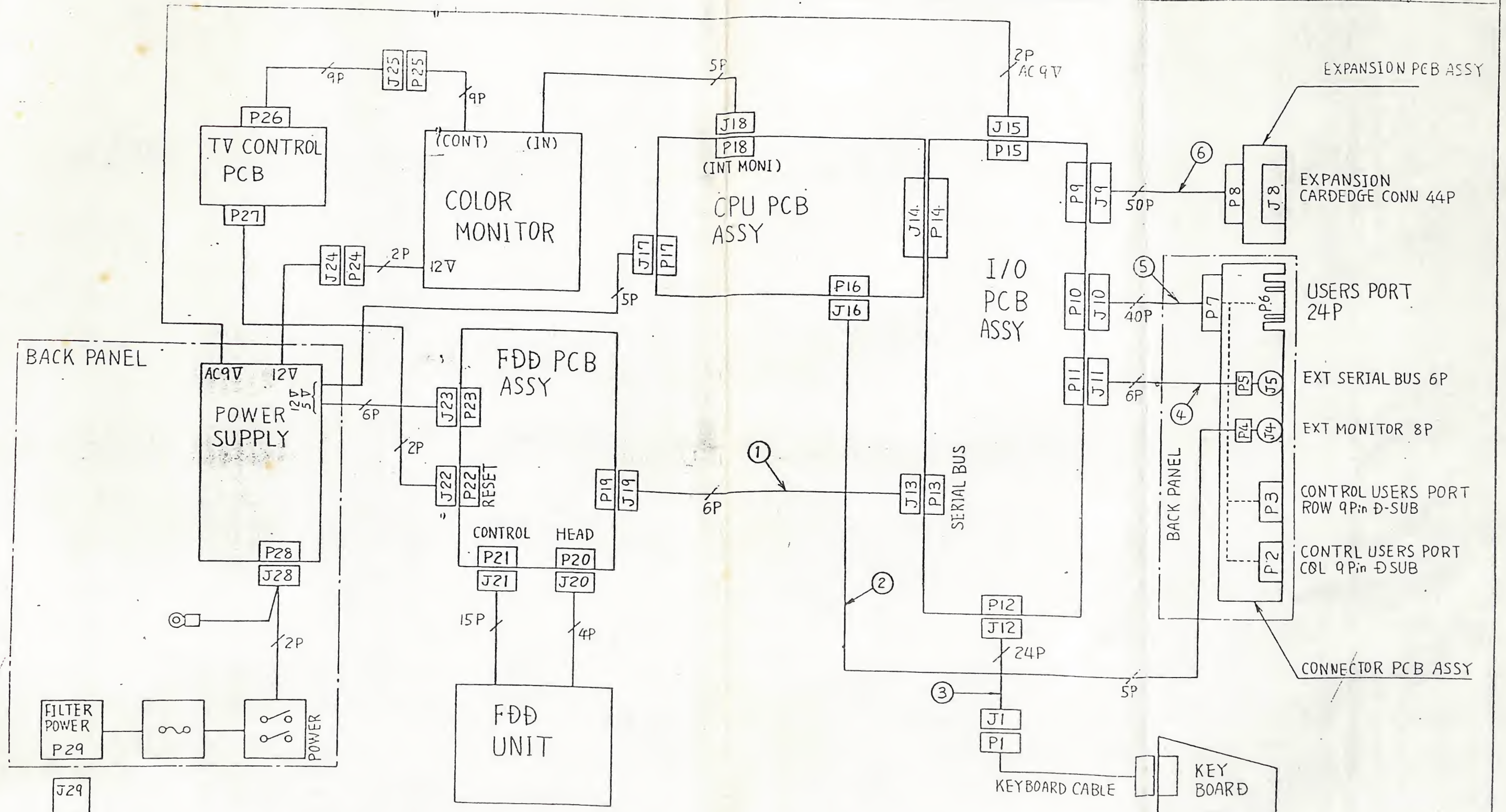
KEYBOARD

UNLESS OTHERWISE SPECIFIED TOLERANCES ON DECIMALS		DRAWN BY: <i>M. Hirano</i>		DATE: <i>7/30/83</i>
X	XX	XXX	1/2"	
MATERIAL		USED ON		NEXT ASSY
FINISH				
		CHKD: <i>C. H. K. K. A.</i>		DATE: <i>8/16/83</i>
		ENGR: <i>R. J. J. J. J.</i>		DATE: <i>8-16-83</i>
		APPR: <i>[Signature]</i>		DATE: <i>10-17-81</i>

SIZE	B	251555	REV	A
SCALE: NONE SHEET 2 OF 2				



REVISIONS				DATE	APPROVED
LTR	ZONE	DESCRIPTION			
A		PRODUCTION RELEASE		10-19-83	<i>[Signature]</i>



- 1 SERIAL BUS CABLE ASSY
- 2 EXT 8P CABLE ASSY
- 3 KEYBOARD INNER CABLE ASSY
- 4 EXT 6P CABLE ASSY
- 5 USERS 40P CABLE ASSY
- 6 EXPANSION 50P CABLE ASSY

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS: .XX .XXX .4'S MATERIAL: FINISH:		DRAWN BY:	DATE	<b>commodore</b>  BLOCK DIAGRAM, SX-64	
		C. HAGISAKA	5/31/83		
		CHKD: C. HAGISAKA	8/16/83		
		ENGR: J. R. RICHIE	8-16-83		
		APPR: J. R. RICHIE	10-19-83		
		USED ON	NEXT ASSY		
		SX-64	250618		
		SIZE	REV		
		B	A		
		SCALE	SHEET		
		NONE	1 OF 1		



PART / DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										1						
										2						
										3	C	251103-01	SCHEMATIC, SX-69 CPU.			
										4	B	906107-01	IC MPS6510A MPU	UD7		MOS
										5	B	906109-01	6567 VIC	UF4		FOR NTSC
										6	B	906112-01	MPS6581 SID	UE3		
										7	B	901453-01	2114L-30 RAM	UE7		
										8	B	901505-01	4164-2 DYNAMIC RAM	UA4~7 UB4~7		
										9	B	901226-01	2364A BASIC ROM	UD4		
										10	B	251104-01-R	2564 KERNAL ROM	UD3		EP-ROM
										11	B	901225-01	2332A CHARA ROM	UD1		
										12	B	901523-01	NE555 TIMER	UG7		
										13	B	901502-01	4066 QUAD ANALOG SW	UG6		
										14	B	901521-57	74LS257 DATA SELECTOR	UA3, UB3		DON'T USE TI'S AND MS'S TTL
										15	B	-58	258 DATA SELECTOR	UB1		DON'T USE TI'S AND MS'S TTL
										16	B	-29	373 8BIT LATCH	UB2		
										17	B	-18	139 DUAL DECODER	UC1		
										18	B	901521-03	08 QUAD ANDGATE	UE6		
										19	B	901522-06	7406 HEX INVERTER BUFFER	UE7		
										20	B	906114-01	7700-001 PLA	UE4		
										21	B	906114-02	MB112A101 PLA	UE4		SUBSTITUTE FOR ITEM 20
										22	B	906111-01	IC 6569 VIC	UF4		FOR PAL
										23	B	902671-02	TRANSISTOR NPN 2SC458	TR1 THRU 8		HITACHI
										24						
										25	B	251105-01	CLOCK UNIT 2-OUT. PUT			TOTSU 14.31818MHZ, 8.1918MHZ, NTSC
										26	B	251105-02	CLOCK UNIT 2-OUT. PUT			TOTSU 17MHZ, 7.68MHZ, PAL
										27	B	325513-01	COIL INDUCTOR 2.2uH	L1		RADIAL
										28	B	325513-02	COIL INDUCTOR 22uH	L2		RADIAL
										29	B	904153-05	IC SOCKET 40PIN	UD7, UE4		
										30	B	-04	22PIN	UE3, 4, UD3		
										31	B	904153-03	IC SOCKET 24PIN	UD4, UD1		
										32						
										33						
										34	B	325563-01	FERRIT BEAD	FB1 THRU 4		RADIAL
										35						
										36						

commodore

TITLE  
PCB ASSY, SX-64 CPU

DRAWN BY:  
I. Mizuhata  
CHKD: C. HANAKA

DATE  
8/14/81

ENGR:  
G. Guhlin  
APPR: J. K. S.

DATE  
8-16-83  
1027-12

SIZE  
B

250408

SHT  
2/5



QUANTITY REQUIRED PER PART / DASH NO.										ITEM	OS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
										1	1	37	B	251070-16	CAPACITOR CERAMIC DISC 330PF/50V	C51																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

commodore

TITLE: PCB ASSY, SX-64 CPU

DRAWN BY: T. M. Zahata  
CHKD: C. H. M. SAKA

DATE: 7/30/83  
8/15/83

ENGR: R. E. L. L. L.  
APPR: C. H. M. SAKA

DATE: 8-16-83  
11-27-83

SIZE: B

250408

REV: B

SHT: 3/5



ACTIVITY RECORD PER PART / DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES	
									03	02	01						
									1	1	1	73	P	250642-27	HEADER ASSY 54 PIN	J14	JAE PS-54SD-D4TS1-1
									1	1	1	74	B	250669-08	8 PIN	P16	MOLEX 5045-08A
									1	1	1	75	B	250669-05	5 PIN	P18	MOLEX 5045-05A
									1	1	1	76	B	250643-06	HEADER ASSY 6 PIN	P17	MOLEX 5285-06A
												77					
												78					
												79					
									1	1	1	80	C	251429-01	HEAT SINK		
									2	2	2	81	C	251341-01	LEAF SPRING		
												82					
												83					
										1	1	84	B	251102-01	PCB FABRICATION, SX-64 CPU		MEIKO FOR UL, BSI, VDE
									1			85	B	251102-02	PCB FABRICATION, SX-64 CPU		FOR CSA
									V <sub>TF</sub>	P <sub>TF</sub>	P <sub>TF</sub>	86	B	251430-01	PCB ARTWORK, SX-64 CPU		
												87	B	251431-01	PCB SILKSCREEN, SX-64 CPU		
									V <sub>TF</sub>	P <sub>TF</sub>	P <sub>TF</sub>	88	B	251432-01	PCB SOLDER MASK, SX-64 CPU		
												89					
												90					
												91					
									2	2	2	92	B	251069-03	CAPACITOR CERAMIC DISK 330pF	C111, C112	
									1	1	1	93	B	251070-22	100pF	C113	
									2	2	2	94	B	251070-20	CAPACITOR CERAMIC DISK 68pF	C102, C114	
												95					
												96					
												97					
												98					
												99					
									1	1	1	100	B	400850-05	DIODE SIGNAL WG 713C	D1	
												101					
												102					
												103					
												104					
												105					
												106					
												107					
												108					

commodore

TITLE

PCB ASSY, SX-64 CPU

DRWN BY:

T. Mizohata

CHKD: C. WAGISAKA

DATE

7/30/83

8/15/83

ENGR:

A. Shiohara

APPR: J. K. L.

DATE

8-16-83

8-27-83

SIZE

B

250408

REV

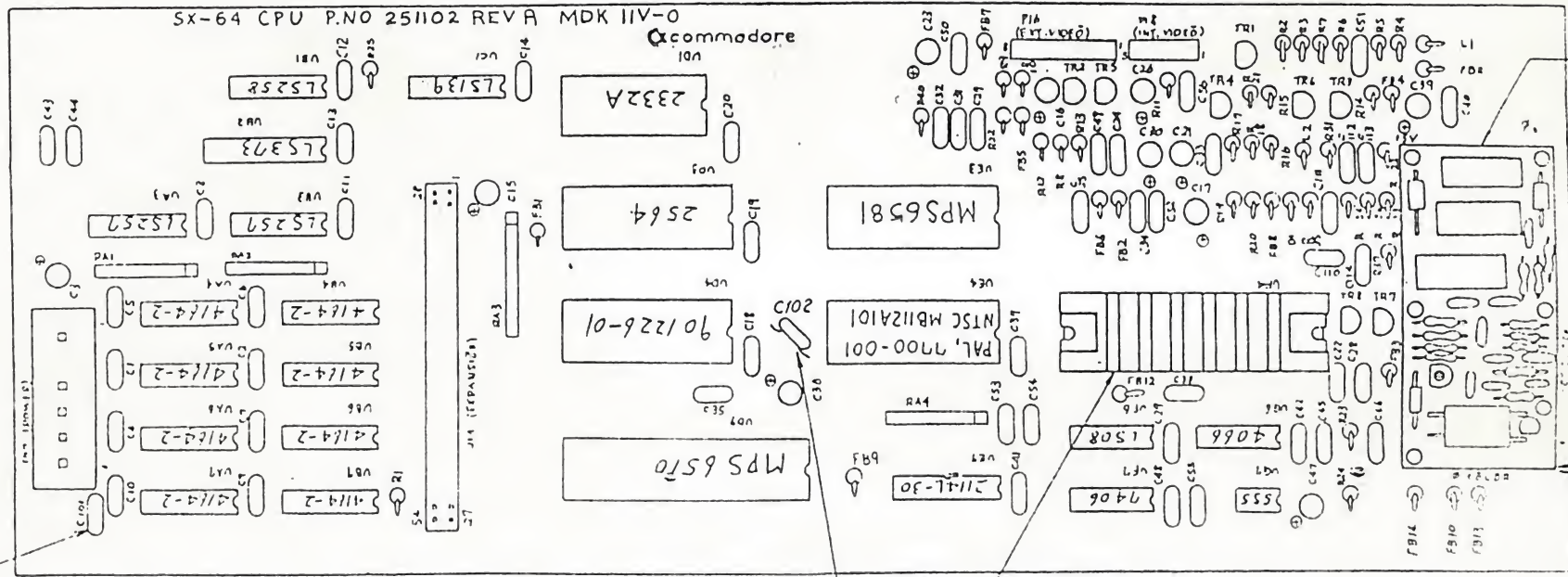
B

SHEET

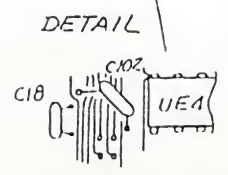
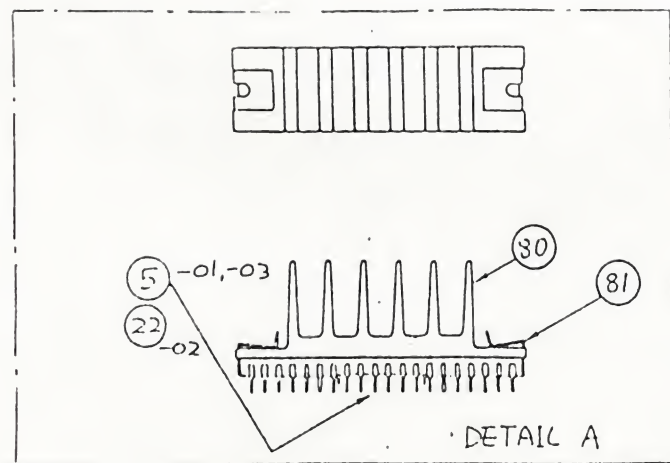
4/5



REVISIONS			APPROVED
LTR	ZONE	DESCRIPTION	
		SEE SHEET	



25-01,-03  
26-02



SEE DETAIL A

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS X    XX    XXX    L'S 1    1    1    1 MATERIAL:    FINISH:		DRAWN BY: T. Mizohata CHKD: CHYUAKA ENGR: R. G. [signature] APPR: [signature]	DATE: 7.25.83 8/15/83 8-15-83 10.27.83	<b>commodore</b>  PCB ASSY, SX-64 CPU	
		USED ON: SX-64 NEXT ASSY: Z50619		SIZE: B 250408	REV: B
				SCALE: NONE SHEET: 5 OF 5	



PART NO.	DESCRIPTION
250410-01	PCB ASSY, SX-64 FDD CONTROL
250410-02	PCB ASSY, SX-64 FDD CONTROL FOR CSA

REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
A		PRODUCTION RELEASE	7/28/83
B		REVISED PER ECO 830529	8/1/83

1. SHEET      6 OF      6 SIZE      B

ASSY DWG

NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	TITLE PCB ASSY, SX-64 FDD CONTROL	DRAWN BY:	DATE	ENGR	DATE	SIZE	DRAWING NUMBER
		T. MIZOHATA	7/30/83	A. G. G. G.	8/26/83	B	250410
		CHKD	8/13/83	APPR	8/11/83		SHEET 1 OF 6



ITEM NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										1						
										2						
										3	C	251110-01	SCHEMATIC, SX-64 FDD CONTROL			
										4						
										5	B	951435-01	IC MPS 6502A CPU	UBC4	M2S	
										6	B	901437-01	MPS 6522 VIA	UBC3, UDC5	M2S	
										7	B	325502-03	1MM 2016P RAM	UA1		
										8						
										9	B	901229-05AE	2564 DOS EP-ROM	UA3		
										10	B	325302-01	2364 ROM	UA4		
										11	B	325572-01	GATE ARRAY	UE5		
										12	B	901521-01	74LS00 QUAD NAND GATE	UC2		
										13	B	-02	04 HEX INVERTER	UB2		
										14	B	-30	14 HEX SCHMIT GATE	UE2		
										15	B	-17	42 DECODER	UD2		
										16	B	-32	86 QUAD EX-OR GATE	UD3, UJ4		
										17	B	901521-06	74LS193 4BIT BINARY COUNTER	UG5		
										18	B	901522-30	7407 HEX NONINVERT BUFFER	UG4, UF3		
										19	B	-01	7417 HEX NONINVERT BUFFER			SUBSTITUTE FOR ITEM 18
										20	B	901522-06	7406 HEX INVERT BUFFER	UE3		
										21	B	901521-54	74LS197 4BIT BINARY COUNTER	UJ5		
										22	B	901522-03	74177 4BIT BINARY COUNTER			SUBSTITUTE FOR ITEM 21
										23	B	901510-01	9602 ONE SHOT MULT	UH4		
										24	B	901523-04	LM311 VOLTAGE COMPARATOR	UK4		
										25	B	901523-08	NE592 VIDEO AMP	UH1, UJ1		
										26	B	251111-01	M54532 QUAD TRANSISTOR ARRAY	UF2	MISBUSHI	
										27	B	251111-02	IC ULN2069A QUAD TRANSISTOR ARRAY	UF2		SUBSTITUTE FOR ITEM 26
										28						
										29	B	902671-01	TRANSISTOR NPN 2SC945	TR1, TR7		
										30	B	902693-01	NPN 2SC1815			
										31	B	902720-01	PNP 2SA673	TR6		SUBSTITUTE FOR ITEM 29
										32	B	902717-01	PNP 2SA733	TR2 ~ 5		
										33	B	902744-01	TRANSISTOR PNP 2SA1015			SUBSTITUTE FOR ITEM 32
										34						
										35	B	901522-05	IC 7404 HEX INVERTER	UE3		
										36						

commodore

TITLE

PCB ASSY, SX-64 FDD CONTROL

DRAWN BY:

T. Ma Zahata

DATE 7/30/83

CHKD: C. W. WAKA

DATE 8/15/83

ENGR:

A. G. W. WAKA

APPR: A. G. W. WAKA

DATE

8/16/83

DATE 8/27/83

SIZE

B

250410

REV

B

SHT

2/6



ASSEMBLY RECORD PER  
PART / DASH NO.

ITEM	QTY	OS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
37	B	900850-05	DIODE	SIGNAL WQ713C	D1~1, D8, D10		
38	B	900850-01		SIGNAL IN4148			SUBSTITUTE FOR ITEM 37
39	B	325505-01		GENER HZ3C-2	D9		
40	B	325506-01	DIODE	GENER HZ5C-2	D7		
41							
42	B	325566-01	CRYSTAL	MODULE 16MHZ ±50PPM			
43	B	325566-02	CRYSTAL	MODULE 16MHZ ±100PPM			SUBSTITUTE ITEM 42
44	B	325513-01	COIL	INDUCTOR 22uH	L6		RADIAL
45	B			22uH	L4.5		
46	B	325513-03	COIL	INDUCTOR 100uH	L1~3		
47							
48	B	325563-01	FERRITE	BEAD	FB1~10		RADIAL
49							
50	B	900100-01	CAP	ELECTROLYTIC 10uF/25V	C18, 32, 33		RADIAL
51	B			33uF/50V	C3		
52	B	900100-40		ELECTROLYTIC 1uF/25V	C31		
53	B	900402-17		TANTALUM 0.47uF/25V	C6, 7		
54	B	251072-24		CERAMIC DISC 47PF 50V	C17		
55	B			330PF 50V	C15, 12		
56	B	251072-32		680PF 50V	C14, 16, 5		
57	B	251074-01		1000PF 25V	C9, C50		
58	B	251074-09		0.002uF 25V	C10, 11		
59	B	251075-06	CAP	CERAMIC DISC 0.1uF 25V	C1, 2, 4, 8	13	22, 23, 24, 25, 26, 27, 28, 29, 30
60					C35, 36, 37	38	39, 40, 41, 34, 19, 20, 21
61	B	904150-06	IC SOCKET	40PIN	UEC4, UDC5		6502-1, 6502-2, PLA-1 (UFS 51P)
62	B	904153-03		24PIN	UA7, UA1		2364-1, 2016-1
63	B	904153-04	IC SOCKET	28PIN	UA3		2364-1
64	B	250644-06	HEADER ASSY	6P, L-ANGLE	P19		MOLEX 5046-06A
65	B	250644-02		2P	P22		MOLEX 5046-02A
66	B	250648-01		5P	P20		MOLEX HIF3G-5P-0.54DS
67	B	250644-15		15P, L-ANGLE	P21		MOLEX 5046-15A
68	B	250643-06	HEADER ASSY	6P, STRAIGHT	P23		MOLEX 5046-06A
69							
70							
71							
72							

commodore

TITLE

PCB ASSY, SX-64 FDD CONTROL

ORWN BY:

T. Mizoguchi

CHKD: CHIGISAKA

DATE

8/5/83

ENGR:

Z. Gidina

APPR: GID

DATE

8-16-83

0-22-83

SIZE

B

250410

REV

B

SHEET

3

6



QUANTITY REQUIRED PER PART / DASH NO.										ITEM	OS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										02-01						
										1	73	251068-40	RESISTOR 47Ω 1/4W ± 5% CARBON	R50		RADIAL
										4	74	-55	150Ω	R21, 22, 37, 38		
										3	75	-59	220Ω	R19, 20, 33		
										3	76	-63	330Ω	R23, 34, 36		
										2	77	-64	360Ω	R28, 31		
										6	78	-67	470Ω	R5, 7, 8, 13	26, 27	
										1	79	-68	510Ω	R29		
										2	80	-71	680Ω	R1, 6		
										9	81	-76	1kΩ	R35, 40, 41	42, 43	46, 47, 48, 49
										1	82	-80	1.5kΩ	R4		
										1	83	-101	10kΩ	R44		
										6	84	-84	22kΩ	R9, 12, 14, 24	25	
										4	85	-109	22kΩ	R2, 15, 16, 30		
										1	86	-126	100kΩ	R39		
										1	87	251068-51	100Ω 1/4W ± 5% CARBON	R45		
										1	88	251265-49	91Ω 1/4W ± 1% METALOX	IDE, R3		
										1	89	-51	100Ω	R11		
										1	90	-55	150Ω	R10		
										2	91	-99	RESISTOR 91kΩ 1/4W ± 1% METALOX	IDE, R17, 18		RADIAL
										1	92	251265-98	8.2kΩ 1/4W ± 5% CARBON	R32		
											93					
											94					
										1	95	251109-01	PCB FABRICATION, SX-64 FDD			
										1	96	251109-02	PCB FABRICATION, SX-64 FDD			FOR CSA
										FE	97	251433-01	PCB ARTWORK, SX-64 FDD			
										FE	98	251434-01	PCB SILK SCREEN, SX-64 FDD			
										FE	99	251435-01	PCB SOLDER MASK, SX-64 FDD			
											100					
											101					
											102					
										1	103	251584-08	WRAPPING WIRE AWG 28 L=45MM			
										1	104	251584-09	WRAPPING WIRE AWG 28 L=95MM			
											105					
											106					
											107					
											108					

commodore

TITLE: PCB ASSY. SX-64 FDD CONTROL

DRAWN BY: T. Mizohata  
CHECKED: H. W. K. A. PA

DATE: 7/30/83  
8/15/83

ENG: R. G. G. G. G.  
APPR: J. G. G. G.

DATE: 7/16/83  
7/27/83

SIZE: B

250410

3

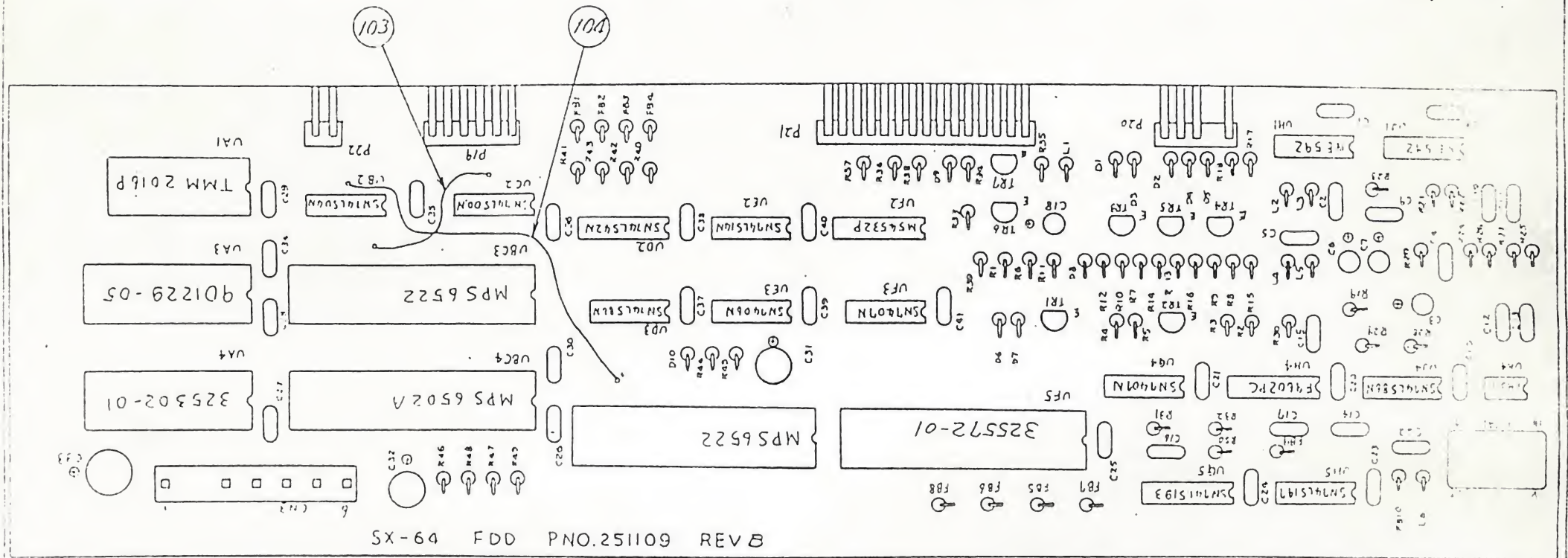
6



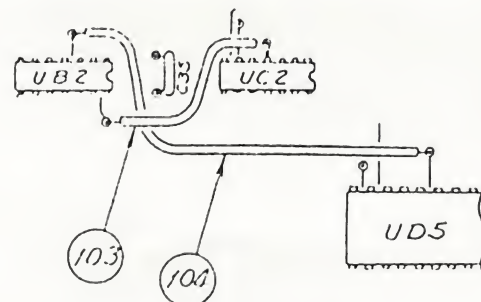
QUANTITY PER PART DASH NO										REV	DS	PART NUMBER	DESCRIPTION	REF DES	BEND									
									0201															
									S S	109	B	901521-04	1C 74LS04	HEX INVERTER	UF3	SUBSTITUTE FOR ITEM 35.								
									S S	110	B	901522-19	1C 7414	HEX SCH INVERTER	UF3	SUBSTITUTE FOR ITEM 35								
									S S	111	B	901521-30	1C 74LS14	HEX SCH INVERTER	UF3	SUBSTITUTE FOR ITEM 35								
										112														
									S S	113	B	901522-05	1C 7404	HEX INVERTER	UB2	SUBSTITUTE FOR ITEM 13								
									S S	114	B	901522-19	1C 7414	HEX SCH INVERTER	UB2	SUBSTITUTE FOR ITEM 13								
									S S	115	B	901521-30	1C 74LS14	HEX SCH INVERTER	UB2	SUBSTITUTE FOR ITEM 13								
										116														
										117														
									S S	118	B	900850-02	DIODE SIGNAL	1S2473	DI-6.8.10	SUBSTITUTE FOR ITEM 37								
									S S	119	B	-07		1S 953(3)										
									S S	120	B	-08		1S 953(7)										
									S S	121	B	900850-14	DIODE SIGNAL	1S1588	DI-6.8.10	SUBSTITUTE FOR ITEM 37								
										122														
										123														
										124														
										125														
										126														
										127														
										128														
										129														
										130														
										131														
										132														
										133														
										134														
										135														
										136														
										137														
										138														
										139														
										140														
										141														
										142														
										143														
										144														
										145														
										146														
commadore										TITLE			PCB ASSY, SX-64 FDD CONTROL			DRAWN BY		DATE	ENGR	DATE	SIZE	DRAWING NUMBER	REV	
													R. Jida			12-20-82					B	250410	B	
													CHKD:					APPN:				SHEET	5	



REVISIONS		
LTR	ZONE	DESCRIPTION
		SEE SHEET



DETAIL OF ITEM 103 & 104 SOLDERING



UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS X XX XXX 4'S	DRAWN BY: T. M. R. R. R.		DATE: 7/12/83		commodore  PCB ASSY, SX-64 FDD CONTROL
	CHKD: C. B. R. R. R.		8/15/83		
	ENGR: J. R. R. R.		8-16-83		
	APPR: J. R. R. R.		4-27-83		
MATERIAL:		USED ON: SX-64	NEXT ASSY: 250410		SIZE: B
FINISH:		REV: B			
SCALE: NONE SHEET 6 OF 6					



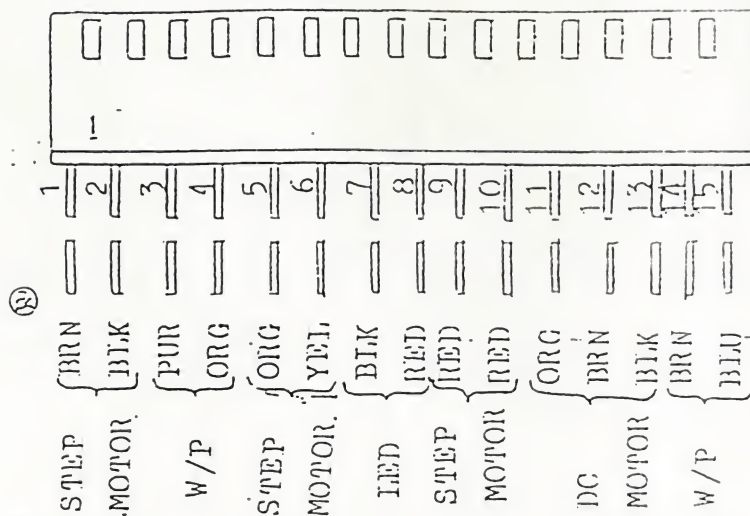
CLASS. NO.

TITLE

Control Line

FUNCTION

Nail to lock

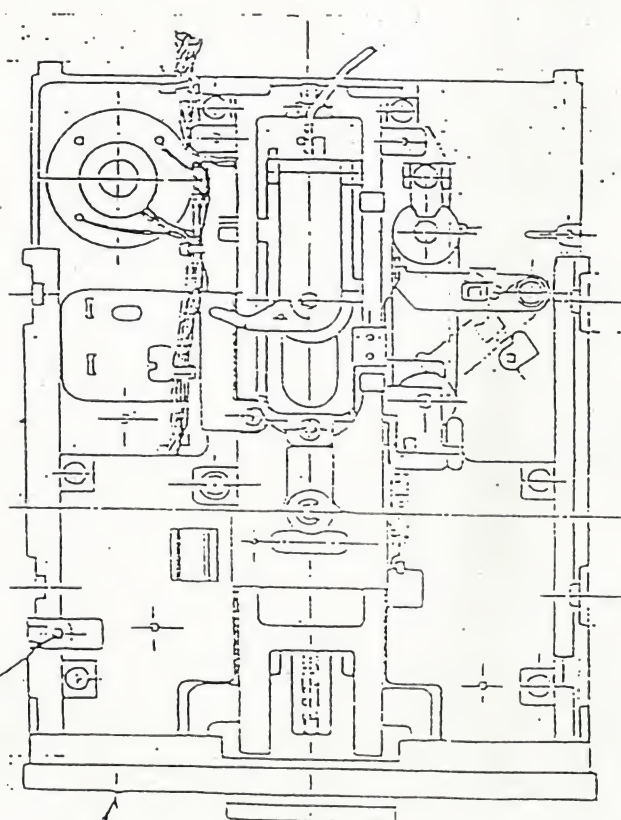


DC MOTOR

BLK RETURN  
BRN +12V  
ORG MOTOR ON

STEP MOTOR

RED +12V  
RED +12V  
YEL C  
ORG A  
BLK B  
BRN D



W/P

TRANSISTOR

ORG (+)  
PUR (-)

DIODE

BRN (+)  
BLU (-)

LED

RED (+)  
BLK (-)

\* Recommended connector  
Molex ~~5045NA~~ 5046NA  
5045NA

APPRO.	CHXD.	DSCD.	TITLE
		Jul 22, 201	OR
		U. H. H.	DOCUMENT NO.
PAGE	SYMB.	DATE	APPRO.



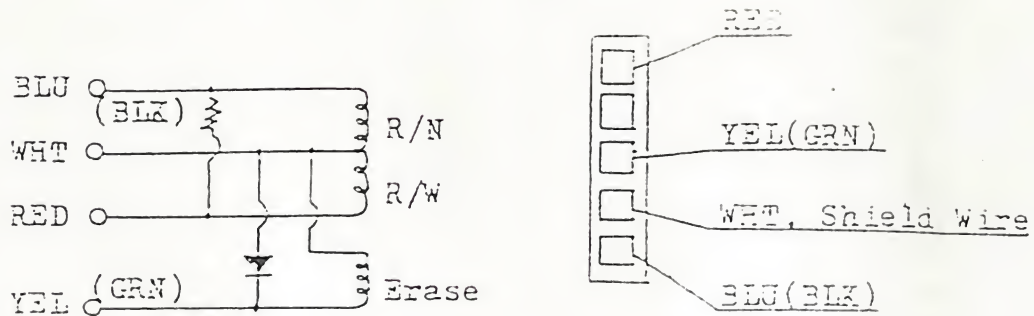
ALPS ELECTRIC CO., LTD.

(東京・大阪・名古屋・京都)

ALPS ELECTRIC CO., LTD.

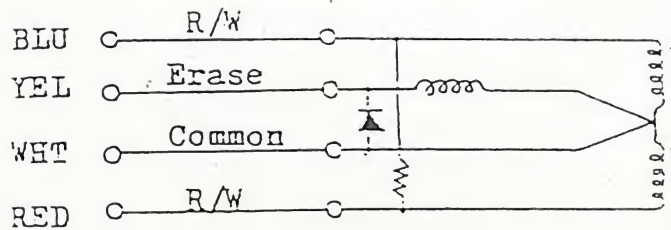
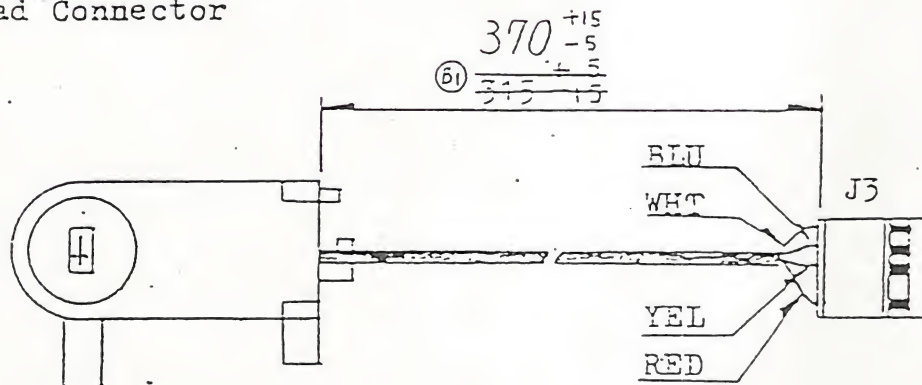


# Connector Pin

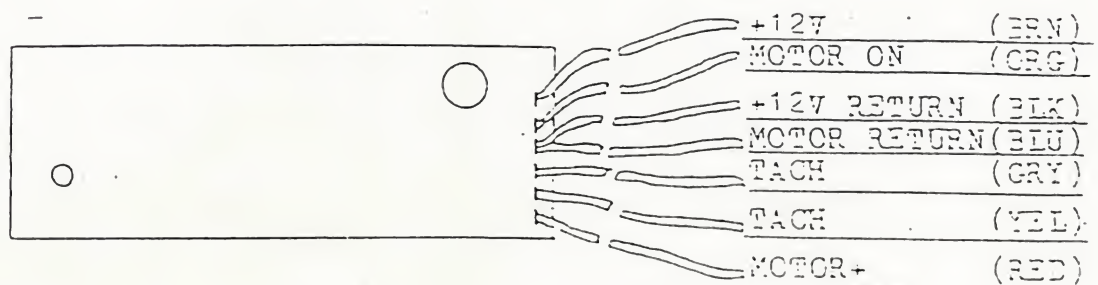


Housing  
Hirose HIF3G-5S-254C  
Terminal  
Hirose HIF3-2428SCFA

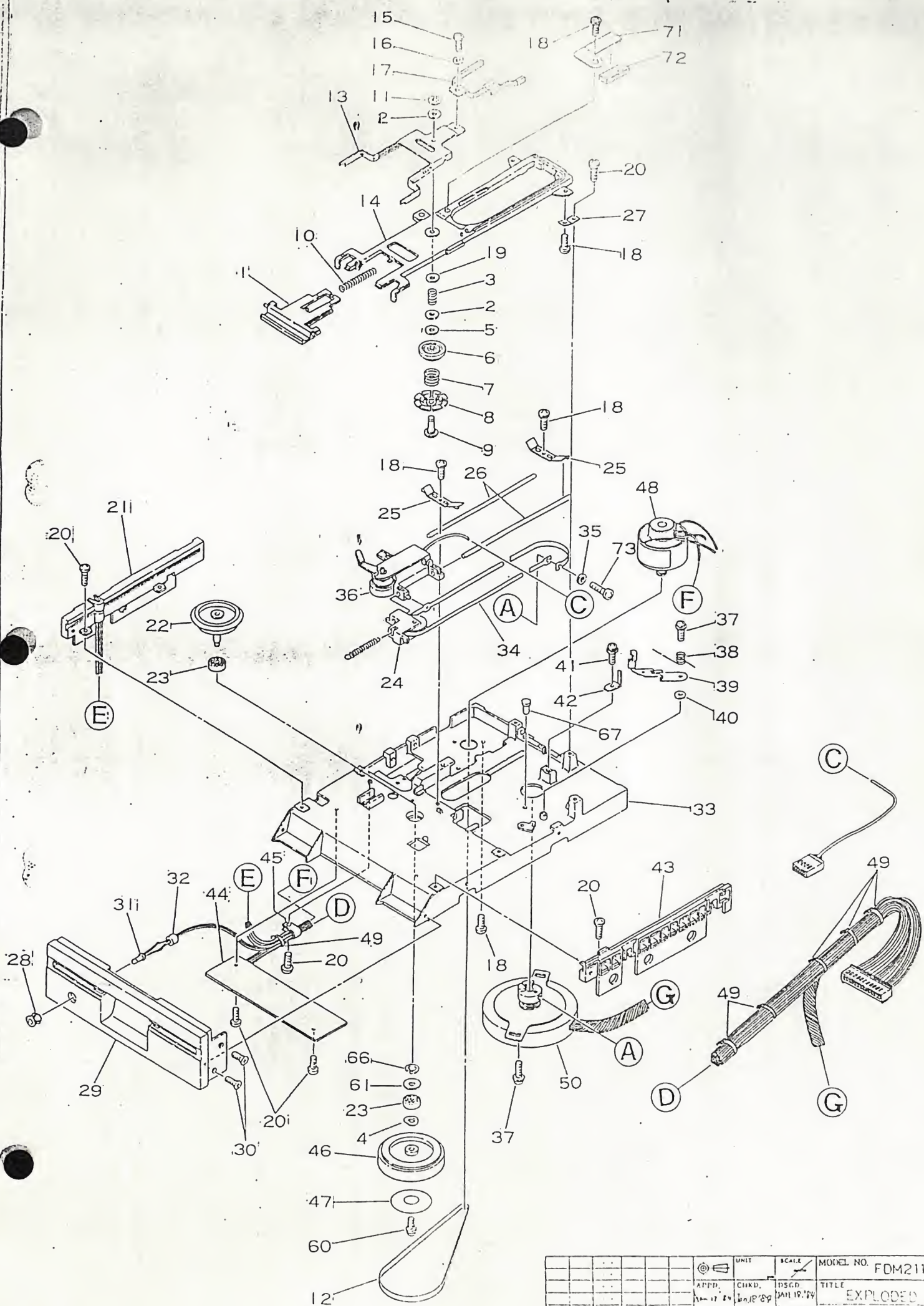
## Head Connector



## DC Motor Control P.C.B

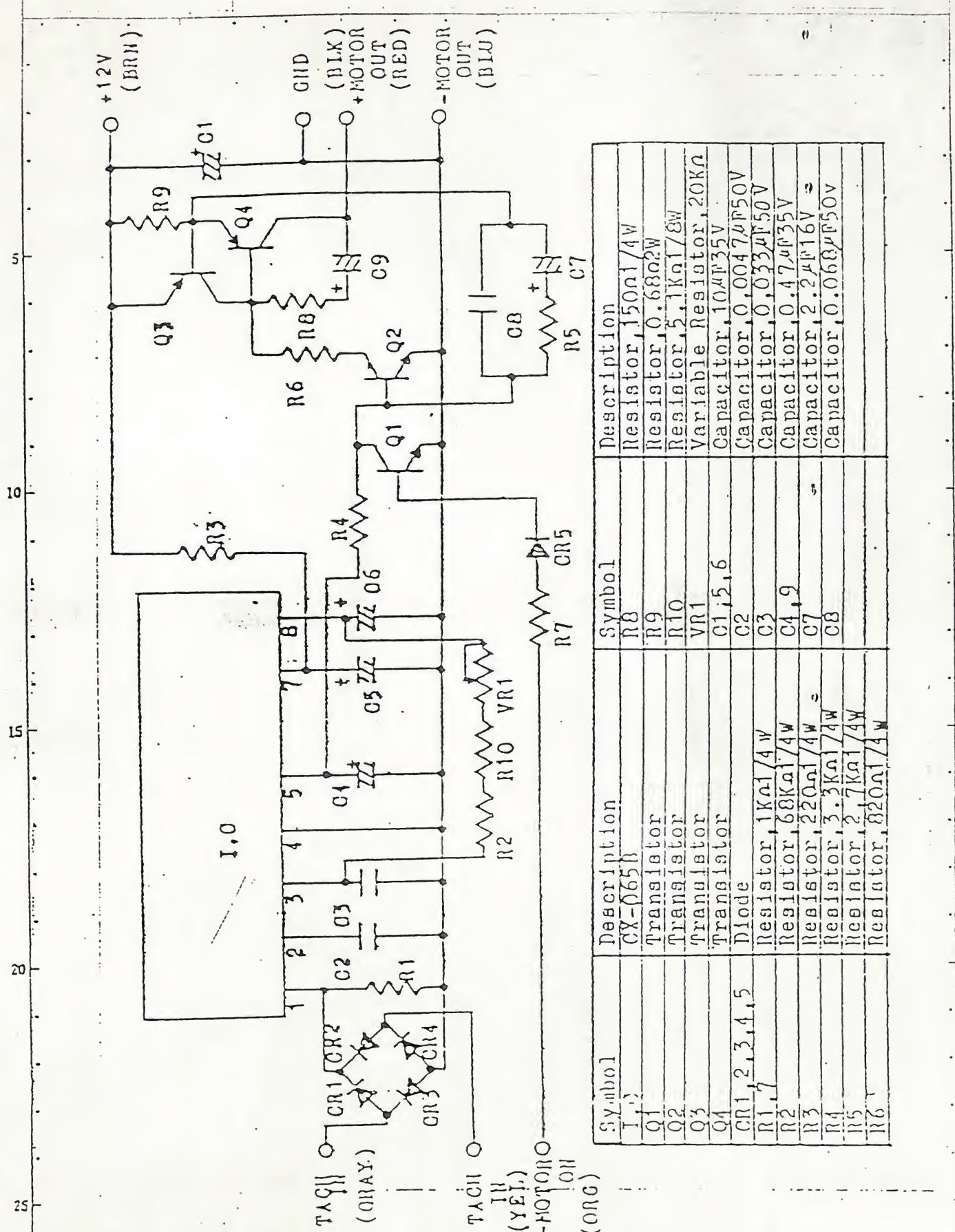






UNIT				SCALE		MODEL NO.	
APPD.	CHKD.	DISCD.	DATE	1:1	1:1	FDM2111-3	
TIME	SYMB.	DATE	APPD.	CHKD.	DISCD.	TITLE	EXPLODED VIEW
ALPS ELECTRIC CO., LTD.				(A3 - 6 EIGHTH)			







NO.	PART NO.	NAME	NO.	PART NO.	NAME	NO.	PART NO.	NAME
1	BH212-A	Door Assy.	25	HY616	Guide Shaft Keeper	49	GR123	Band
2	HY623	Collar	26	EY142	Guide Shaft	50	QY153-A	Stepper Assy.
3	WS114	Clamp Spring	27	HY712	Hinge Spring	51		
4	GW115	Wave Washer	28	BG111	LED Holder	52		
5	GW114	Thrust Washer	29	BH131	Front Panel	53		
6	BJ122-A	Collet Assy.	30	2A121064	Screw	54		
7	WS142	Hub Spring	31	DE111-AG	LED Assy.	55		
8	BJ112	Hub	32	BG211	LED Holder Ring	56		
9	EY114	Hub Shaft	33	VY119	Housing	57		
10	WS171	Door Spring	34	GR134	Steel Belt	58		
11	2L003001	E-Washer	35	GW118	Washer	59		
12	GR111	Drive Belt	36	QY124-D	Head Assy.	60	2A271030	Screw
13	HY581	Hub Support	37	2A331050	Screw	61	2LFD0011	Washer
14	FY117	Hub Frame	38	WS157	Eject Spring	62		
15	2A151040	Screw	39	HY532-A	Eject Assy.	63		
16	2G102602	Washer	40	GW123	Poly Slider	64		
17	HY582-A	Arm Support Assy.	41	2A341060	Screw	65		
18	2A132040	Screw	42	HY551	Carriage Stopper	66	2M313001	C-Washer
19	HY625	Collar	43	BG262-A	Disk Guide-R Assy.	67	GP114	Eject Pin
20	2A131050	Screw	44	PY133AA	Motor Control P.C.B	68		
21	BG261-AL	Disk Guide-L Assy.	45	GR152	Cord Holder	69		
22	EY182	Spindle Unit	46	UP512	Spindle Pulley	70		
23	GU127	Spindle Bearing	47	GT111	Tacho Disk	71	JS482	Pad Holder
24	UP533-A	Tension Pulley Assy.	48	QY112	D.C Motor	72	GS112	Pressure Pad
						73	2A151030	Screw

UNIT		SCALE		MODEL NO.	
mm		1/2"		FDM2111-84	
APPD.	CHKD.	DSGD.	TITLE		
Jan 18 '84	Jan 18 '84	JAN. 18 '84	EXPLODED VIEW		
ZONE		SYMB.	DATE	APPD.	CHKD.
DATE		APPD.	CHKD.	DSGD.	DOCUMENT NO.
JAN 18 1984					



## 1, specifications

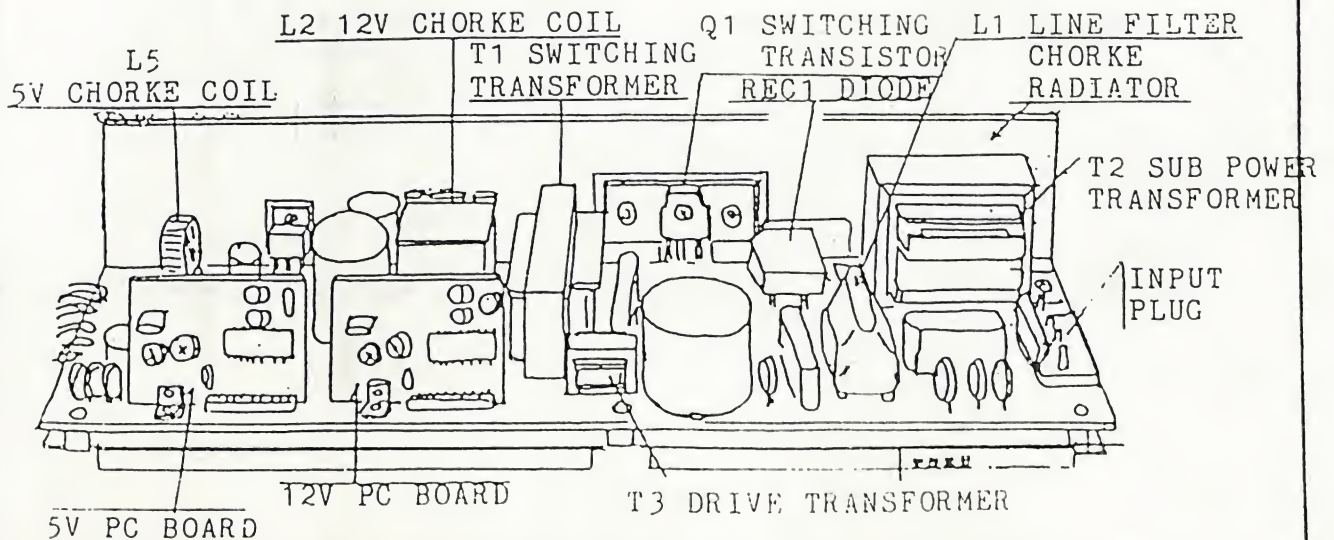
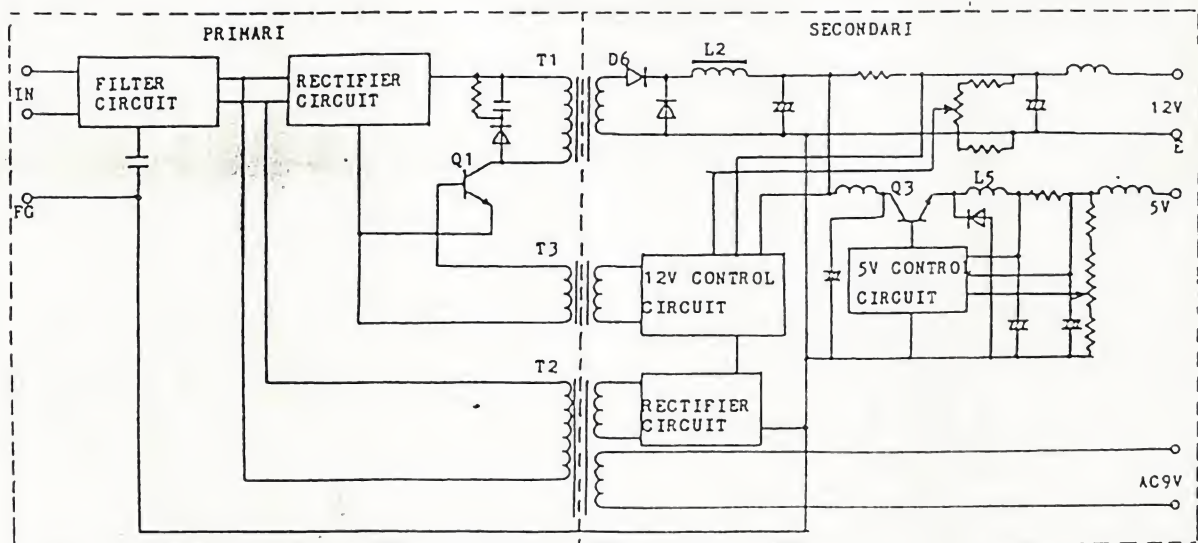
### 1-1 INPUT

1-1-1	VOLTAGE	AC 230V 10% 50.60Hz
1-1-2	POWER	75W typ
1-1-3	SURGE CURRENT	25A max

### 1-2 OUTPUT

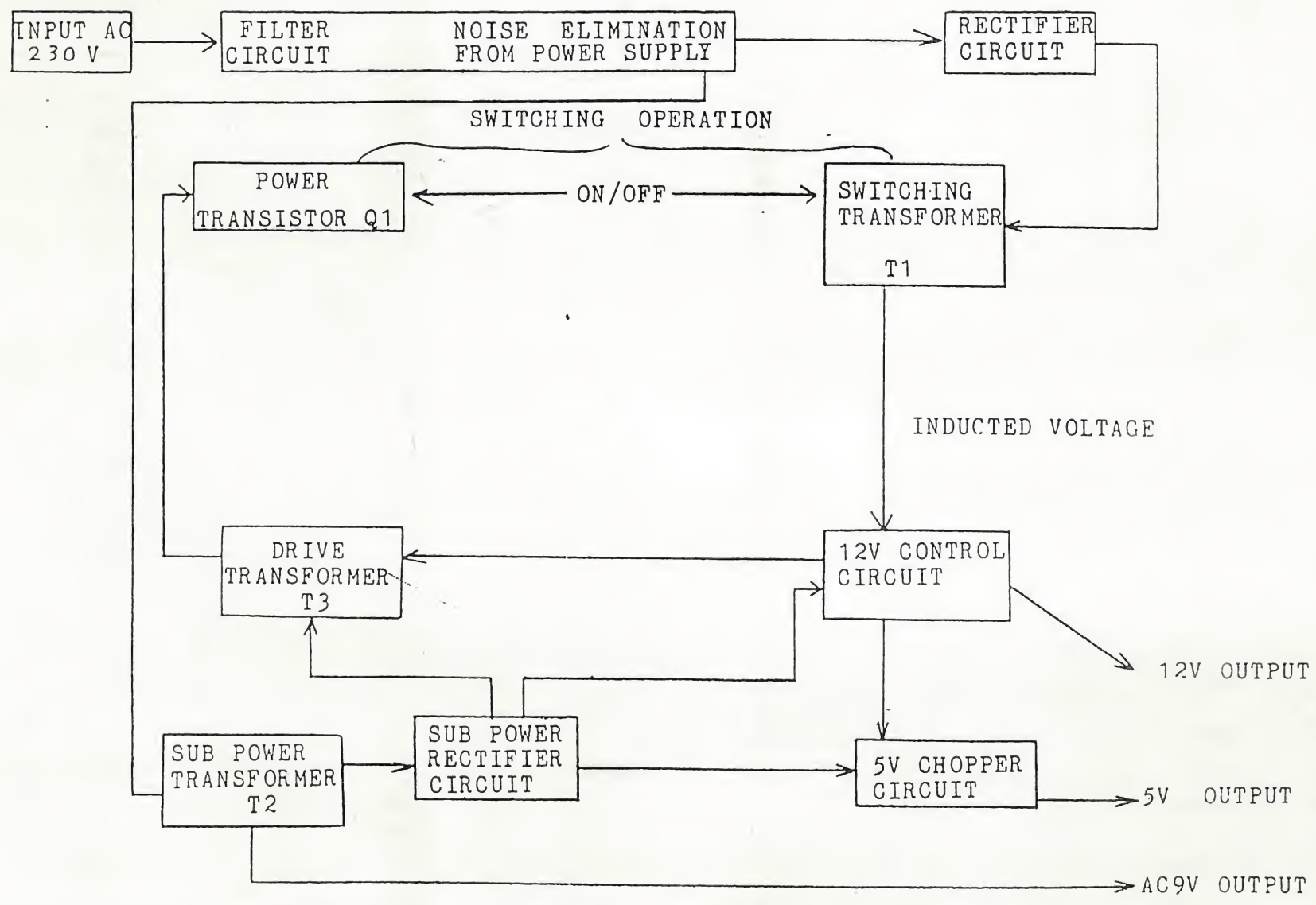
1-2-1	VOLTAGE	5V 2% , 12V 2% , AC9V 3%
1-2-2	CURRENT	5V; 3.15A , 12V; 2.76A , AC9V; 200mA
1-2-3	VARIATION	5V 3% , 12V 5% , AC9V 15%
1-2-4	RIPPLE	5V; 150mV(p-p) , 12V; 290mV(p-p)
1-2-5	OVER CURRENT	5V ; 3.6~4A
	PROTECTION	12V ; 3.6~4A

## 2, CIRCUIT





BLOCK DIAGRAM



(1/3) ~ ~ ~ (2)

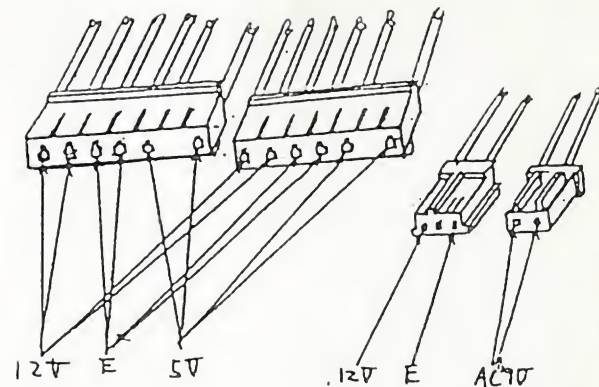
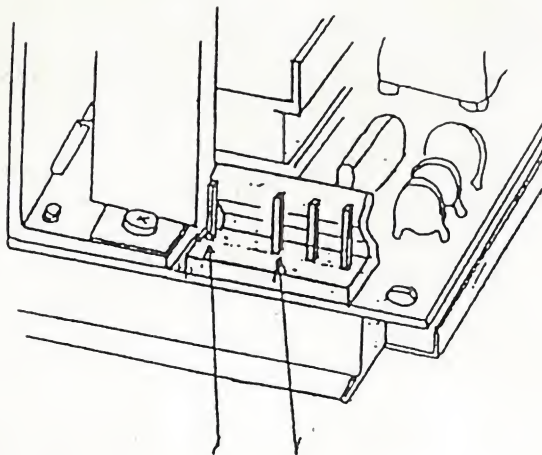


### 3. ALIGNMENT INSTRUCTION

#### 1. INPUT OUTPUT CONNECTION

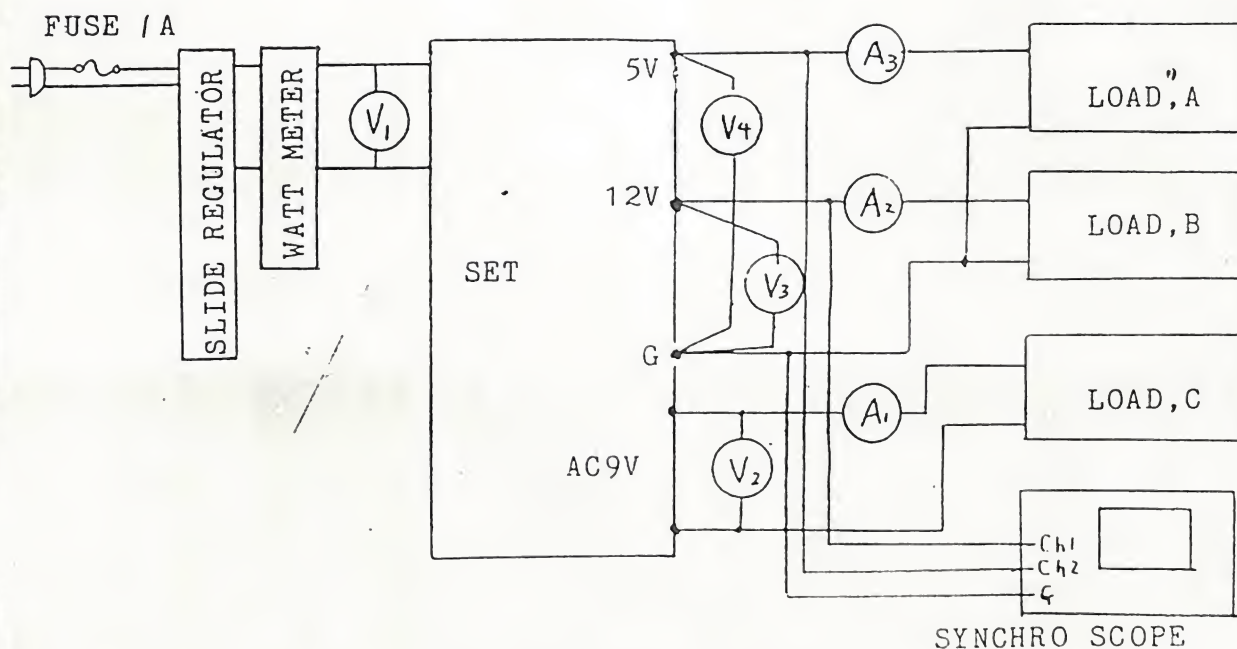
INPUT

OUT PUT



IN PUT 230V 50/60Hz

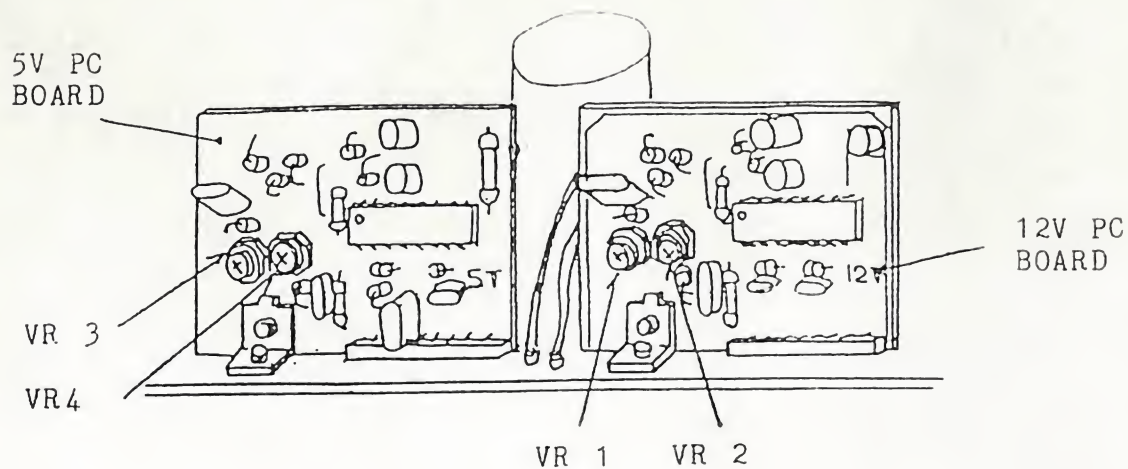
CONNECT :ON



- 1) SLIDE REGULATOR
- 2) WATT METER
- 3) LOAD A,B
- 4) V1
- 5) V2
- 6) V3
- 7) V4
- 8) A1
- 9) A2,3
- 10) LOAD C

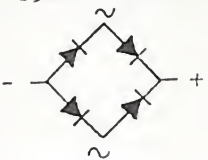
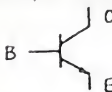

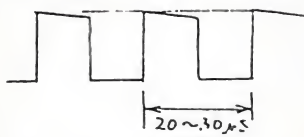
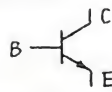
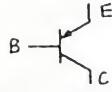
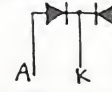
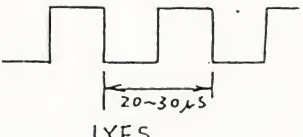
AC 220~240V  
 AC WATT MATER TYP 75W  
 ELECTRONIC LOAD TYP 12V , 5A  
 AC VOLTAGE METER TYP 120V 240V  
 AC VOLTAGE METER TYP 9V  
 DC VOLTAGE METER TYP 12V  
 DC VOLTAGE METER TYP 5V  
 AC CURRENT METER TYP 200mA  
 DC CURRENT METER TYP 3A  
 SLIDE RESISTOR TYP 45Ω





Step	Item	Remarks For Adjustment
1	Connection	Connect the SET as Per SKETCH 6
2	Volume (VR)	Turn VR1,VR2,VR3,VR4 onPC Board for 5V,12V Till the End in Clockwise Rotation
3	AC Power ON	Set Slide Reguleter at 230V and AC Power ON
4	Rated Current Setting	Set Circuit Loaded as Belows 1) Load A DC 5V 3.15A 2) Load B DC 12V 2.76A 3) Load C AC 9V 200mA
5	Output Voltage Adjustment	Adjust VR2 and VR4 then Set in the Range of the Following Voltage 1) DC 5V (VR4) 4.970~5.030V 2) DC 12V (VR2) 11.950~12.050V
6	Operation of Over-Current Protection and Adjustment of the Point	Adjust and Set VR1,VR3 to Operate Over-Current Protection at the Following Values 1) DC 5V (VR3) 3.6~4A 2) DC 12V (VR1) 3.6~4A



PROBLEMS	CHECK POINT	CAUSES AND TEST	SOLUTION
NO AC 9V OUTPUT	SUPPLEMENTARY CIRCUIT	T1 TRANSFORMER SHORT OR OPEN YES T1 PRIMARY LEAD WHITE TO WHITE 160~200Ω SECONDARY LEAD RED TO RED 9~12Ω SECONDARY LEAD BLUE TO BLUE 3.2~3.4Ω OK	
IN CASE OF REC1 SHORT FUSE IS CUT	CHECK BRIDGE DIODE	REC2 S1V6-10 DIODE RECTIFIED VOLTAGE DC 12~15V REC1 S3WB40 SHORT OR OPEN YES	CHANGE REC1
			
IN CASE OF Q1 SHORT FUSE IS CUT	CHECK SWITCHING TRANSISTOR	Q1 2SC2792 SHORT OR OPEN YES	CHANGE Q1
			
	CHECK HIGH-SPEED RECTIFY DIODE	D6 ESAC85-009 SHORT OR OPEN YES	CHANGE D6
			
	12V CONTROL CIRCUIT	CHECK BETWEEN COLLECTOR AND EMITTER OF 2SC2792 IN Q1 BY SYNCHRO-SCOPE NO	CHANGE A BOARD OF 12V CONTROL
			
		12V OUTPUT ADJUSTMENT SHIFT YES	RE-ALIGNMENT
5V output ONLY NO OUTPUT	CHECK SWITCHING TRANSISTOR	Q3 2SC2334 SHORT OR OPEN YES	CHANGE Q3
			
	CHECK DRIVE TRANSISTOR	Q4 2SA1020-00rY SHORT OR OPEN YES	CHANGE Q4
			
	CHECK HIGH-SPEED RECTIFY DIODE	D7 ESAC82-004 SHORT OR OPEN YES	CHANGE D7
			
	5V CONTROL CIRCUIT	CHEC BETWEEN EMITTER OF 2SC2334 AND GRUND IN Q4 BY SYNCHRO-SCOPE NO	CHANGE A BOARD OF 5V CONTROL
			
		5V OUTPUT ADJUSTMENT SHIFT YES	RE-ALIGNMENT

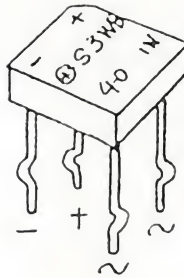
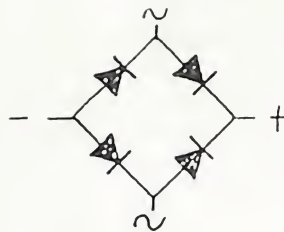


## 5. SEMICONDUCTOR PARTS APPEARANCE

1, REC1

S3WB (4)

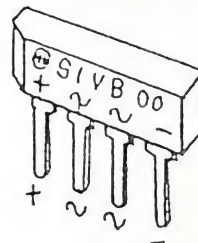
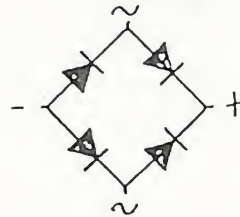
RECTIFIER STACKS DIODES



2, REC2

S1VB10

RECTIFIER STACKS DIODES



3, D1

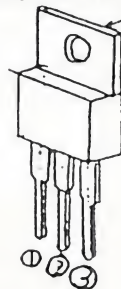
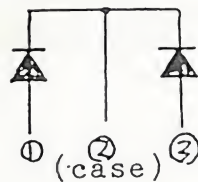
ERB28-08

FAST RECOVERY DIODES



4, D6,7

ESAC85-009 , ESAC82-004 SCHOTTKY BARRIER DIODES

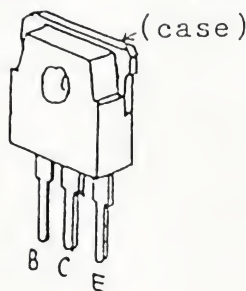
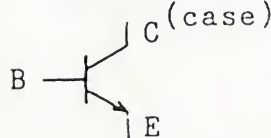


JEDEC:TO-220AB

5, Q1

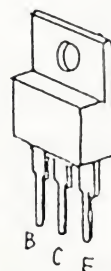
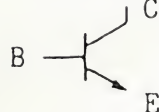
2SC2C2792or3351

POWER TRANSISTOR



6, Q3

2SC2334 (case)

POWER TRANSISTOR  
C (case)

JEDEC:TO-220AB



7, Q4

2SA1007

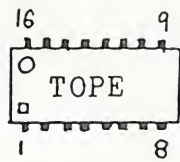
TRANSISTOR



8, IC1,2

MB3759

INTEGRATED CIRCUITS



7, Q4

2SA1117

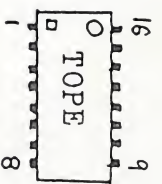
TRANSISTOR



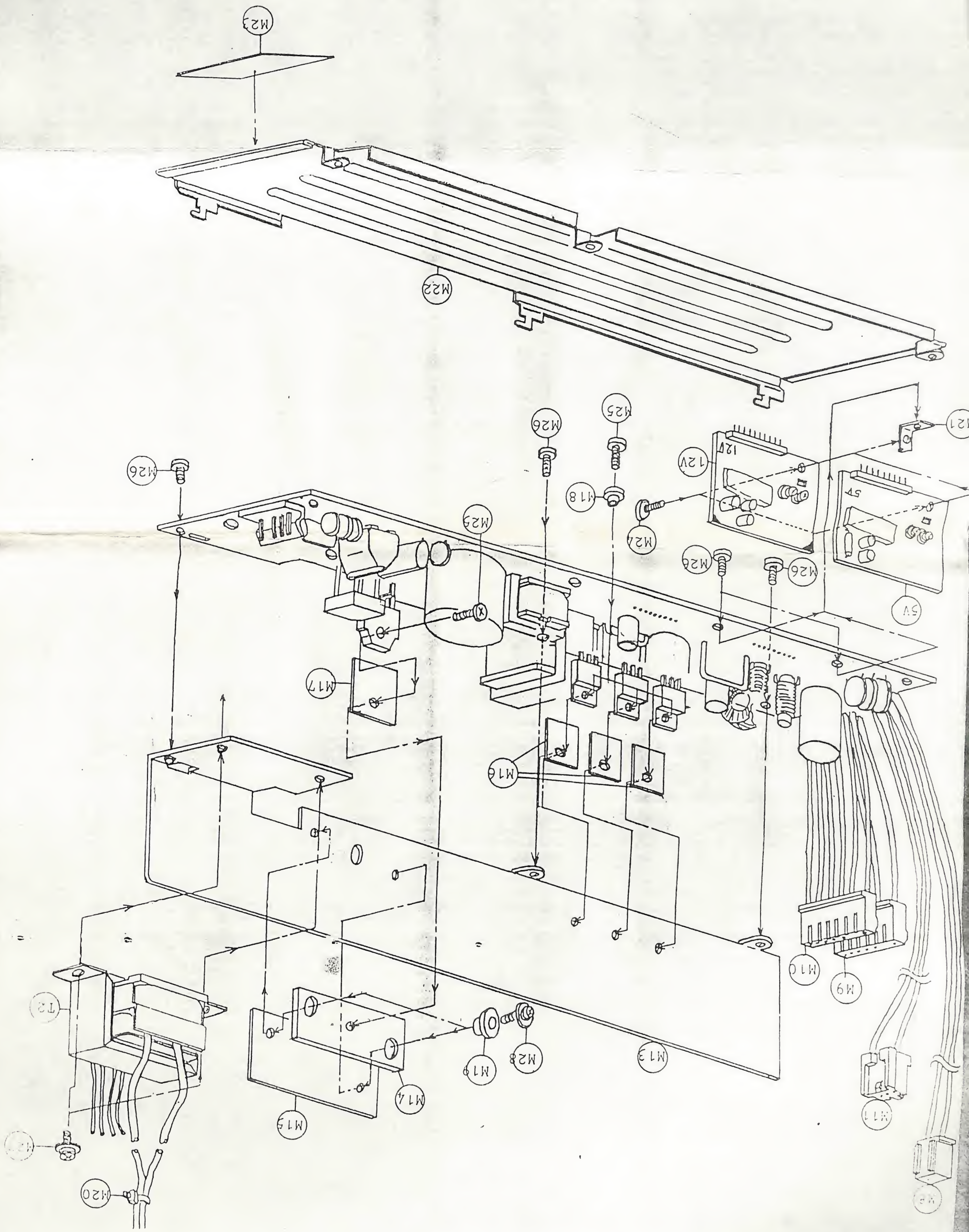
8, IC1,2

MB3759

INTEGRATED CIRCUITS







EXPLODED VIEW AND PARTS LISTS  
EXPLODED VIEW



Symbol	Part, No	Part Name	Description	Safety Part	Service Part
C21	68-0343F	CEE102A10V	CEE CAPACITOR		
C22	68-2701K	CMP224A63K-N	CMP CAPACITOR		
C23	68-27080	CPS104A50K-N	CPS CAPACITOR		
C24	68-0343F	CEE102A10V	CEE CAPACITOR		
C25	68-27080	CPS104A50K-N	CPS CAPACITOR		
C27	68-0341E	CEE479A50V	CEE CAPACITOR		
C28	68-2708I	CPS103A50K-N	CPS CAPACITOR		
C29	68-0341F	CEE100A50V	CEE CAPACITOR		
C30	68-2708F	CPS332A50K-N	CPS CAPACITOR		
C31	68-0341E	CEE479A50V	CEE CAPACITOR		
C32	68-2708I	CPS103A50K-N	CPS CAPACITOR		
C33	68-27080	CPS104A50K-N	CPS CAPACITOR		
C34	68-0341E	CEE479A50V	CEE CAPACITOR		
C36	68-2811G	CC472A2500Z	CC CAPACITOR		
C37	68-2811G	CC472A2500Z	CC CAPACITOR		
C40	68-0341F	CEE100A50V	CEE CAPACITOR		
C41	68-27080	CPS104A50K-N	CPS CAPACITOR		

## RESISTORS

Part Name.with RD:Carbon Resistor

Part Name.with SRM:Metal Oxide Film Resistor

R1	68-2503K	8D-13	POWER SHERMISTOR	!	0.5%
R2	68-4951Y	SRM15K-J3A	SRM RESISTOR	!	
R3	68-4943Y	SRM100-J2A	SRM RESISTOR	!	
R4	68-0332Y	RD22-J1/2A	RD RESISTOR	!	
R5	68-4937A	SRM10-J1A	SRM RESISTOR	!	
R9	68-4937A	SRM10-J1A	SRM RESISTOR		
R10	68-4937A	SRM10-J1A	SRM RESISTOR		
R11	68-0353A	MANGANEN WIRE			
R12	68-0299V	RD30K-J1/4D	RD RESISTOR		
R13	68-0298M	RD1K-J1/4D	RD RESISTOR		
R14	68-0299C	RD4.7K-J1/4D	RD RESISTOR	!	
R15	68-0298R	RD1.6K-J1/4D	RD RESISTOR	!	
R16	68-0297S	RD150-J1/4D	RD RESISTOR		
R17	68-0280S	RD820-J1/4B	RD RESISTOR		
R18	68-4937A	SRM10-J1A	SRM RESISTOR		
R19	68-0299V	RD30K-J1/4D	RD RESISTOR		
R20	68-0353A	MANGANEN WIRE			
R21	68-0298M	RD1K-J1/4D	RD RESISTOR		
R22	68-0298Y	RD3.3K-J1/4D	RD RESISTOR		
R24	68-0298V	RD2.4K-J1/4D	RD RESISTOR		
R25	68-0281K	RD4.7K-J1/4B	RD RESISTOR	!	
R26	68-0281S	RD10K-J1/4B	RD RESISTOR	!	
R27	68-0300Y	RD470K-J1/4D	RD RESISTOR	!	
R30	68-0299Q	RD18K-J1/4D	RD RESISTOR		
R31	68-0299G	RD6.8K-J1/4D	RD RESISTOR		
R32	68-0300I	RD100K-J1/4D	RD RESISTOR		
R33	68-4937A	SRM10-J1A	SRM RESISTOR		
R34	68-0298S	RD1.8K-J1/4D	RD RESISTOR		
R35	68-0281M	RD5.6K-J1/4B	RD RESISTOR		
R36	68-0281M	RD5.6K-J1/4B	RD RESISTOR		
R37	68-0300I	RD100K-J1/4D	RD RESISTOR		
R38	68-0299V	RD30K-J1/4D	RD RESISTOR		
R40	68-0299M	RD12K-J1/4D	RD RESISTOR		
R41	68-0298A	RD330-J1/4D	RD RESISTOR		

製作者



## 10. PARTS LIST

Symbol	Part, No	Parts Name	Description	Safety Parts	Service Parts
TRANSFORMERS & COILS					
T1	68-4090A	SWITCHING TRANSFORMER		!	0.5%
T2	68-1110A	SUB POWER TRANSFORMER		!	
T3	68-0854A	DRIVE TRANSFORMER		!	
L1	68-1606D	UF2327F	LINE FILTER CHORKE		
L2	68-1366D	SKU-33-B8	CHORKE COIL		
L3	68-0306A	5 $\mu$ H	CHORKE COIL		
L4	68-0013B	FN-R8S	CHORKE COIL		
L5	68-1351A	SK11-2-100	CHORKE COIL		
L6	68-0306A	5 $\mu$ H	CHORKE COIL		
TRANSISTORS & DIODES					
Symbol No.with Q:Transistor		Symbol No.with REC:Diode			
Symbol No.with D:Diode					
Q1	68-2056F	2SC2792or3551	SWITCHING TRANSISTOR	!	0.5%
Q3	68-0040C	2SC2334-K	SWITCHING TRANSISTOR		0.2%
Q4	68-2001A	2SA1020-0,Y	TRANSISTOR		0.1%
REC1	68-0345F	S3WB-60	DIODE	!	0.1%
REC2	68-2254A	S1VB-10	DIODE		0.1%
D1	68-2034C	ERB28-08	DIODE		0.1%
D6	68-0035D	ESAC-85-009	DIODE		0.1%
D7	68-0035B	ESAC-82-004	DIODE		0.1%
ICs					
IC1	68-1912A	MB3759	IC	!	0.1%
IC2	68-1912A	MB3759	IC	!	0.1%
CAPACITORS					
Part Name.with CC:Ceramic Capacitor					
Part Name.with CMP:Metallized Polyester Film Capacitor					
Part Name.with CPS:Polyester Film Capacitor					
Part Name.with CEE:Aluminum Electolytic Capacitor					
C1	68-2712I	CMP224A250K-N	CMP CAPACITOR	!	
C2	68-2811D	CC102A2500K	CC CAPACITOR	!	
C3	68-2811D	CC102A2500K	CC CAFACITOR	!	
C4	68-2811E	CC222A2500M	CC CAPACITOR	!	
C5	68-2811E	CC222A2500M	CC CAPACITOR	!	
C6	68-2712G	CMP104A250M	CMP CAPACITOR	!	
C7	68-2610D	CEE221D400R	CEE CAPACITOR	!	
C8	68-2709S	CMP104A630K-N	CMP CAPACITOR	!	
C9	68-2812A	CC221A1000K	CC CAPACITOR	!	
C11	68-0341R	CEE101A35V	CEE CAPACITOR		
C12	68-2814D	CC222A2000K	CC CAPACITOR		
C13	68-2814D	CC222A2000K	CC CAPACITOR		
C14	68-2610B	CEE472D25Q	CEE CAPACITOR		
C15	68-2701K	CMP224A63K-N	CMP CAPACITOR		
C16	68-2708D	CPS104A50K-N	CPS CAPACITOR		
C17	68-0342R	CEE222A16V	CEE CAPACITOR		
C18	68-2708D	CPS104A50K-N	CPS CAPACITOR		
C19	68-0342S	CEE332A16V	CEE CAPACITOR		

Symbol	Part, No	Part Name	Material	Safety Part	Service Part
R42	68-0300I	RD100K-J1/4D	RD RESISTOR		
R45	68-0299A	RD3.9K-J1/4D	RD RESISTOR		
R50	68-0336U	RD330K-J1/2A	RD RESISTOR	!	
SEMI FIXED RESISTOR					
VR1	68-0119B	RGS6-FAN500		!	0.2%
VR2	68-0119F	RGS6-FAN1K			0.2%
VR3	68-0119B	RGS6-FAN500			0.2%
VR4	68-0119F	RGS6-FAN1K			0.2%
MISCELLANEOUS					
M1	68-4114A	PC BOARD (A)		!	
M2	68-4115A	PC BOARD (B) 1/2		!	
M3	68-4505A	JOINT P=7.5mm			
M4	68-4505B	JOINT P=10mm			
M5	68-4505C	JOINT P=12.5mm			
M6	68-4505D	JOINT P=15mm			
M6	68-3521F	ANGLE PLUG, M34-09-30-134P		!	
M7	68-3514C	PLUG, 5285-04A			
M8	68-3516A	CONNECTOR 2P ASS			0.2%
M9	68-3519A	CONNECTOR 6P ASS			0.2%
M10	68-3519A	CONNECTOR 6P ASS			0.2%
M11	68-3517A	CONNECTOR 3P ASS			0.2%
M12	68-4003L	TUBING (UL)		!	0.5%
MECHANICAL PART					
M13	68-5086A	RADIATOR (A)			
M14	68-5087A	RADIATOR (B)			
M15	68-5082A	RADIATION SEAT (SARCON 45F)		!	
M16	68-0026B	RADIATION SEAT TO-220 (SARCON 45F)		!	0.2%
M17	68-0352A	RADIATION SEAT TO-3P (SARCON 45F)		!	0.5%
M18	68-0076A	BUSHING		!	
M19	68-0025A	BUSHING (C)		!	
M20	68-5078A	BAND (KM-85)			
M21	68-0069A	L ANGLE			
M22	68-5083A	SIIRUDO PLATE			
M23	68-5088A	LABEL			
SCREWS					
M24	68-5800C	BIND HEAD 3.0×6mm			
M25	68-5800D	BIND HEAD 3.0×8mm			
M26	68-0015E	BIND HEAD 3.0×6mm (SUS)			
M27	68-5802B	W-SEMS 3.0×6mm			
M28	68-5802D	W-SEMS 3.0×10mm			
M29	68-5089A	NYLON RIVET			
PCB ASS					
12V	68-5100	12V PC BOARD ASS		!	0.2
5V	68-5099	5V PC BOARD ASS			0.2

94054



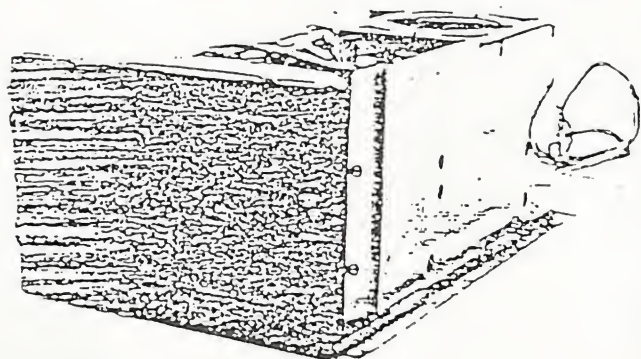
# Commodore

## SERVICE MANUAL

MODEL

250622-02

5" COLOR VIDEO MONITOR



No. 5463  
SEPT. 1983



## CONTENTS

SPECIFICATIONS .....	2
1. SAFETY PRECAUTION FOR MONITOR .....	3
2. SERVICE ADJUSTMENT .....	4 ~ 7
3. REPLACEMENT PARTS LIST .....	8 ~ 11
[EXPLODED VIEW] .....	11
4. BLOCK DIAGRAM .....	12
* With 250622-02 SCHEMATIC DIAGRAM	

## SPECIFICATIONS

Dimensions: 16.5cm(W) x 28.0cm(D) x 11.6cm(H)

Weight: 14.4 kg

Color System ..... PAL

Horizontal resolution ..... 220 Lines

Video/Sync Input ..... 1Vp-p.

Chroma Input ..... 1Vp-p.

Audio input ..... 0.8Vp-p, High Impedance.

Scan frequency ..... H. 15.63 kHz, V. 50 Hz

Power input ..... DC 12V

Power Consumption ..... 1.35A(max.), 1.18A(Avg.)

Picture tube ..... 5", 55 degree deflection, In-line gun Dot screen Quick Start.

Viewable picture size ..... 7.9 cm(H) x 10.4 cm(W)

High voltage ..... 14 kV  $\pm$  1 kV (at zero beam current)

Speaker ..... 6.6cm round type, 16  $\Omega$

Audio power output ..... 0.45 W

Tube ..... 1

IC ..... 4

Transistor ..... 25


(Design and specifications subject to change without notice.)



# 1. SAFETY PRECAUTION

1. The product contains special safety features. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

2. Alterations of the design or circuitry of receiver should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

3. Many electrical and mechanical parts in television sets have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (  ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.

4. If any repair has been made to the chassis, it is recommended that the B<sub>1</sub> setting should be checked or adjusted. See ADJUSTMENT OF B<sub>1</sub> VOLTAGE).

5. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

6. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k $\Omega$  2W resistor to the anode button.

7. The product should be handled with care. Do not touch the internal components of the product. Always use the manufacturer's replacement components.

## 8. ISOLATION CHECK

### (SAFETY FOR ELECTRICAL SHOCK HAZARD)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, channel selector knob, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

#### (1) DIELECTRIC STRENGTH TEST

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1,100 V AC (r.m.s.) for a period of one second.

This method of test requires a test equipment not generally found in the service trade.

#### (2) LEAKAGE CURRENT CHECK

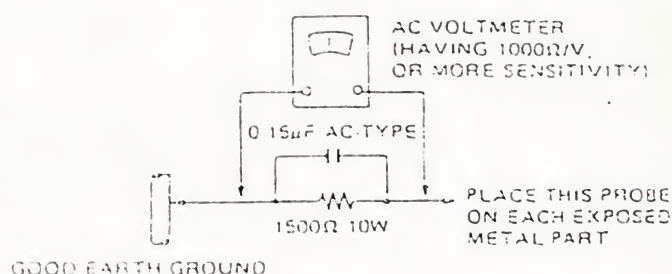
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.) Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).

#### • ALTERNATE CHECK METHOD

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 $\Omega$  10W resistor paralleled by a 0.15 $\mu$ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.).

Measure the AC voltage across the resistor with the AC voltmeter.

Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.35V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).



## 2. SERVICE ADJUSTMENTS

### PURITY

1. Check the screen pattern.
  2. Adjust the deflection yoke lock (See Fig. 2-1) and the magnet lock clockwise to loosen it.
  3. Turn the green cutoff VR (R707) fully clockwise and the red and blue cutoff VRs (R704, R701) fully counter-clockwise. (Fig. 2-8)  
Adjust the screen VR (Fig. 2-8) so that the vertical green band becomes easy to see.
  4. Loosen the deflection yoke securing screw and slide the yoke fully rearward to obtain color shading in the green disk.
  5. Overlap the two purity magnet tabs and set them to 12 o'clock position.
  6. Open and close the two purity magnets (scissor fashion) and adjust so that the green disk is positioned at the centre of the picture.
- If green disk is not obtained, adjust for uniform overall coloration.
7. Slide the deflection yoke forward and adjust its position so that the green color completely fills the picture area.
  8. Confirm that uniform overall rasters of both red and blue single color rasters can also be obtained in the same manner.
  9. Secure the deflection yoke retaining screw moderately so that the deflection yoke does not move back and forth.

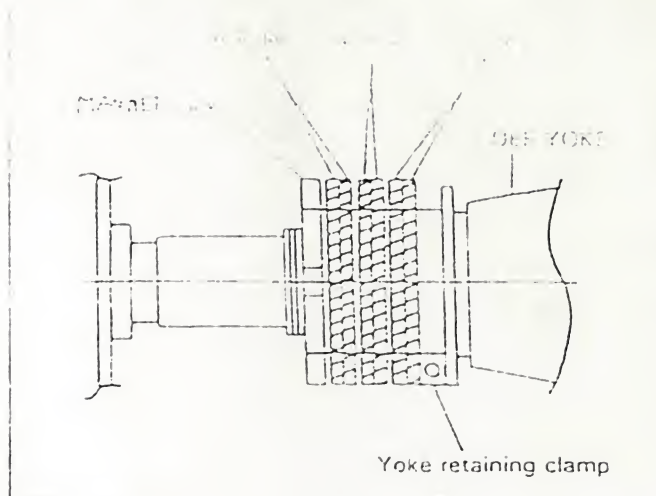


Fig. 2-1



Fig. 2-2

### STATIC CONVERGENCE (CENTER)

1. Employ a crosshatch pattern and adjust the brightness so that the image is clear, but slightly darkened.
2. Turn the red and blue cutoff VRs fully clockwise and the green cutoff VR fully counter-clockwise (Fig. 2-5). Adjust the screen VR (Fig. 2-8) for an easily seen image.
3. Adjust convergence roughly in the corner by tilting the deflection yoke vertically or horizontally, then insert a wedge between the yoke and CRT on top.
4. Turn the two 4 pole convergence magnets and adjust so that red and blue become overlapped throughout the picture area to yield magenta. (Fig. 2-4)
5. Turn the green cutoff VR full clockwise and adjust the two 6 pole convergence magnets so that the green and magenta become overlapped throughout the picture area to yield white. (Fig. 2-5)
6. Repeat steps 4 and 5.

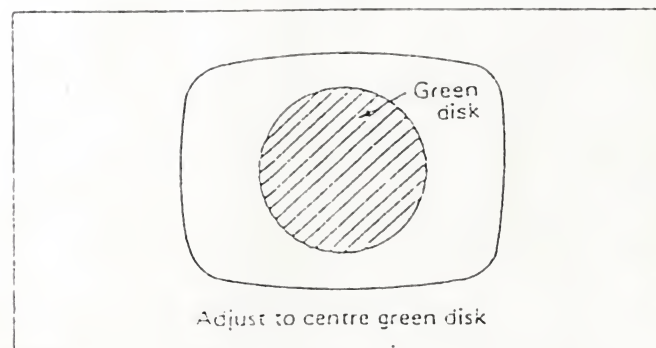


Fig. 2-3

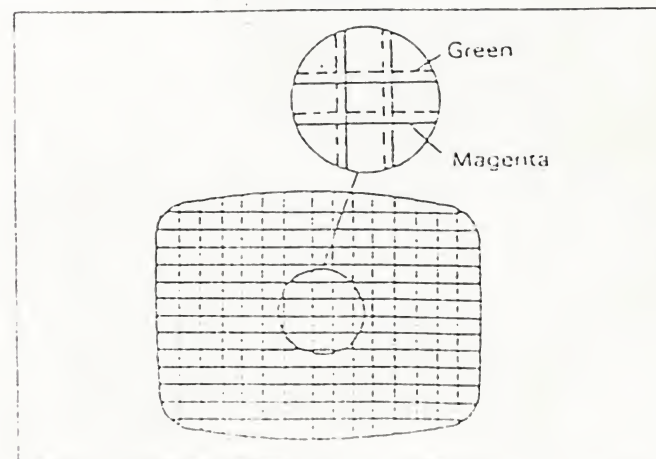


Fig. 2-4



## DYNAMIC CONVERGENCE (CONER)

1. Remove the wedge.
2. Adjust convergence as shown in Fig. 2-7 by tilting the deflection yoke up and down, then insert the wedges in top and bottom.
3. Apply (modeler's) glue on the wedges and magnets to fix.
4. Tighten the screw of the deflection yoke.
5. Turn the magnet lock and tighten securely.

## WHITE BALANCE

1. Display a monochrome pattern.
2. After switching the cut off service SW. to SERVICE, short TP-35A and TP-35B with a jumper wire, and then display a single horizontal line.
3. Turn the red, blue and green cutoff VRs (R704, R701, R707) and the screen VR (Fig. 2-8) fully counter-clockwise to eliminate luminance.
4. Gradually turn the screen VR clockwise to where single line of one of the colors appears.
5. Turn the cutoff VR of this color clockwise about 10 degrees.
6. Again turn the screen VR so that this color appears only faintly.
7. Adjust the other cutoff VRs so that the horizontal line becomes white.
8. After removing a jumper wire which are shorted at step 2), return the cut off service SW. to NORMAL and then display a monochrome pattern.
9. With a dark picture, perform fine adjustment to obtain optimum white balance.
10. With a bright picture, adjust the red and green drive VRs for optimum white balance.

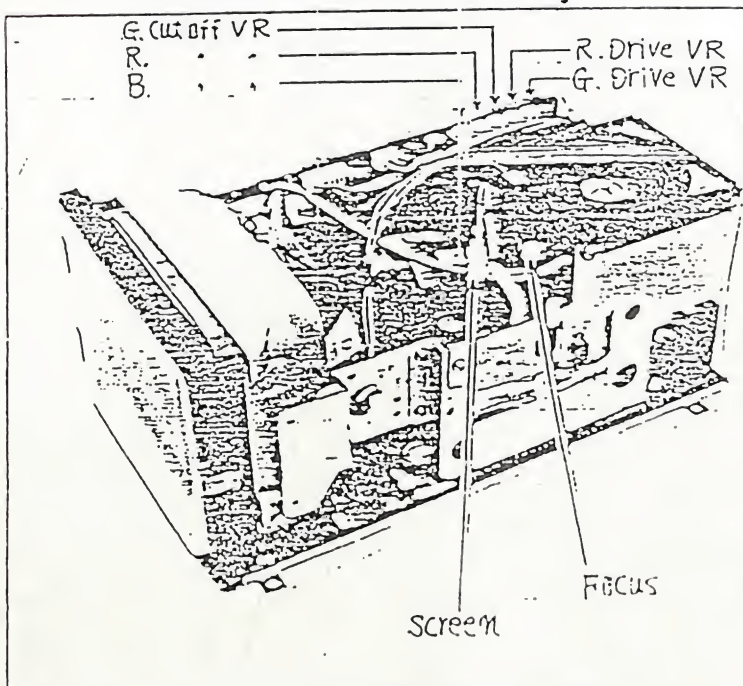


Fig. 2-8

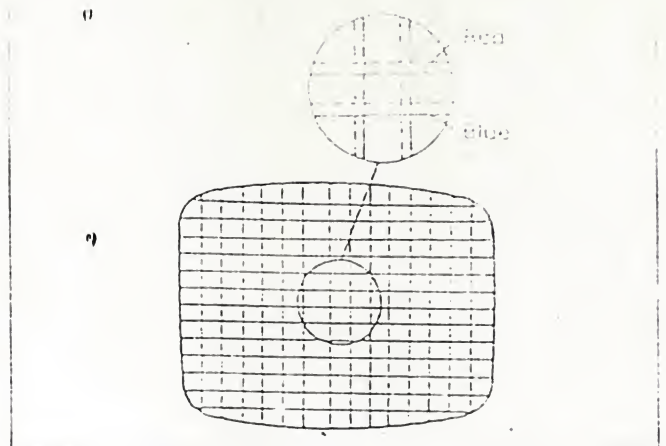


Fig. 2-5

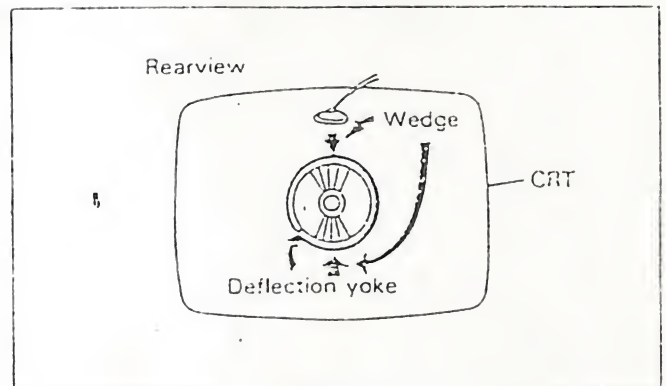


Fig. 2-6

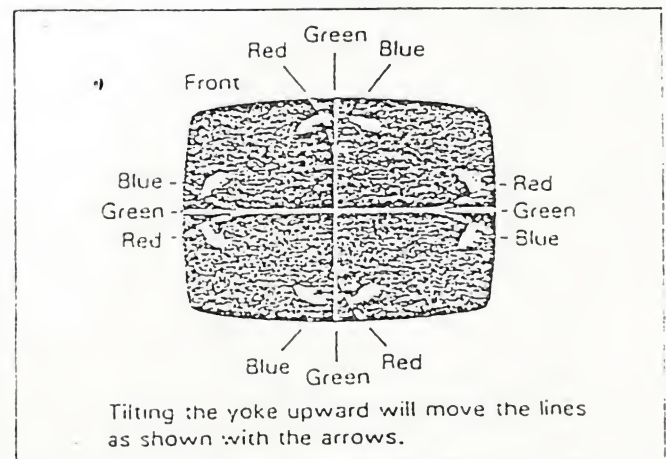
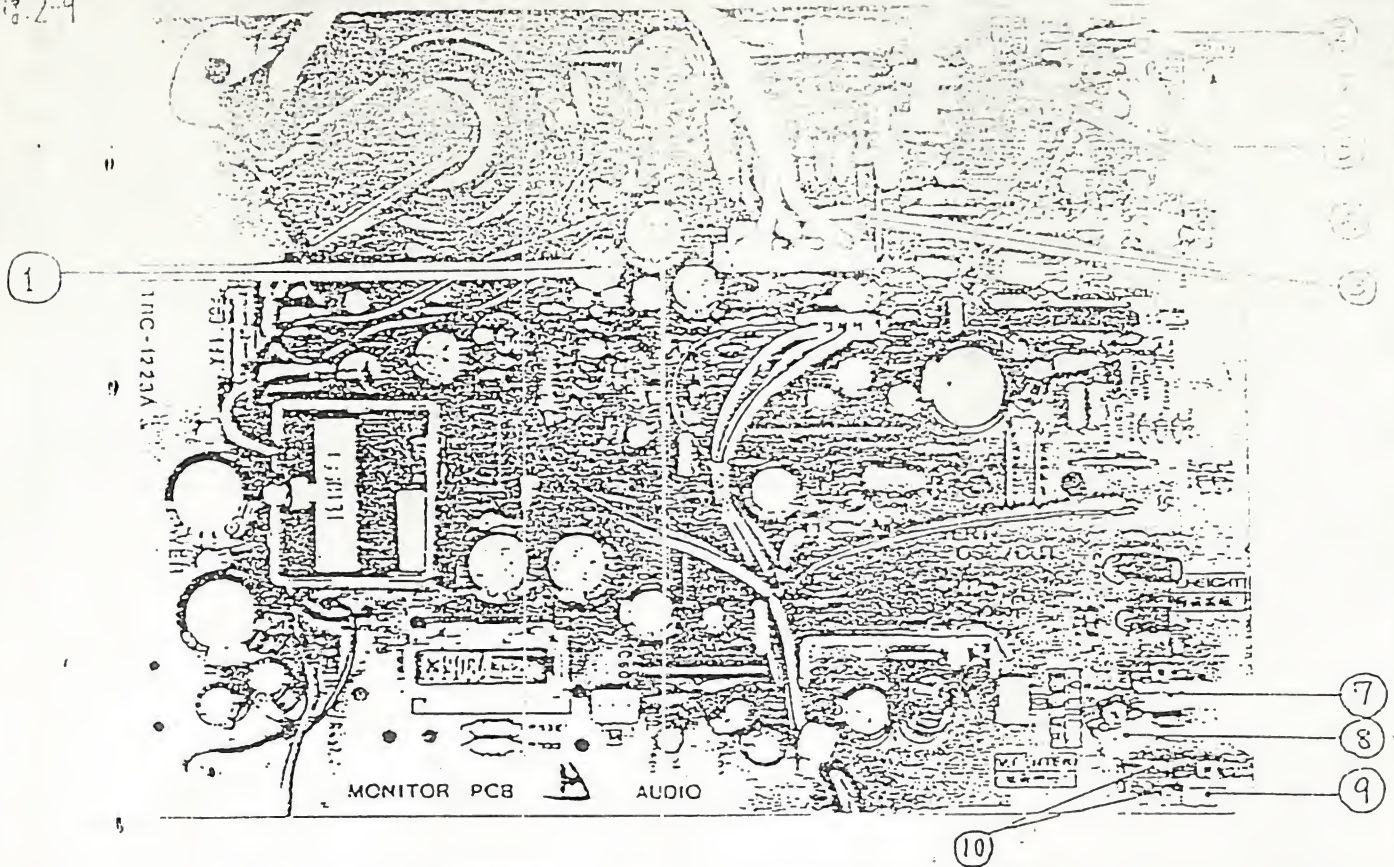


Fig. 2-7

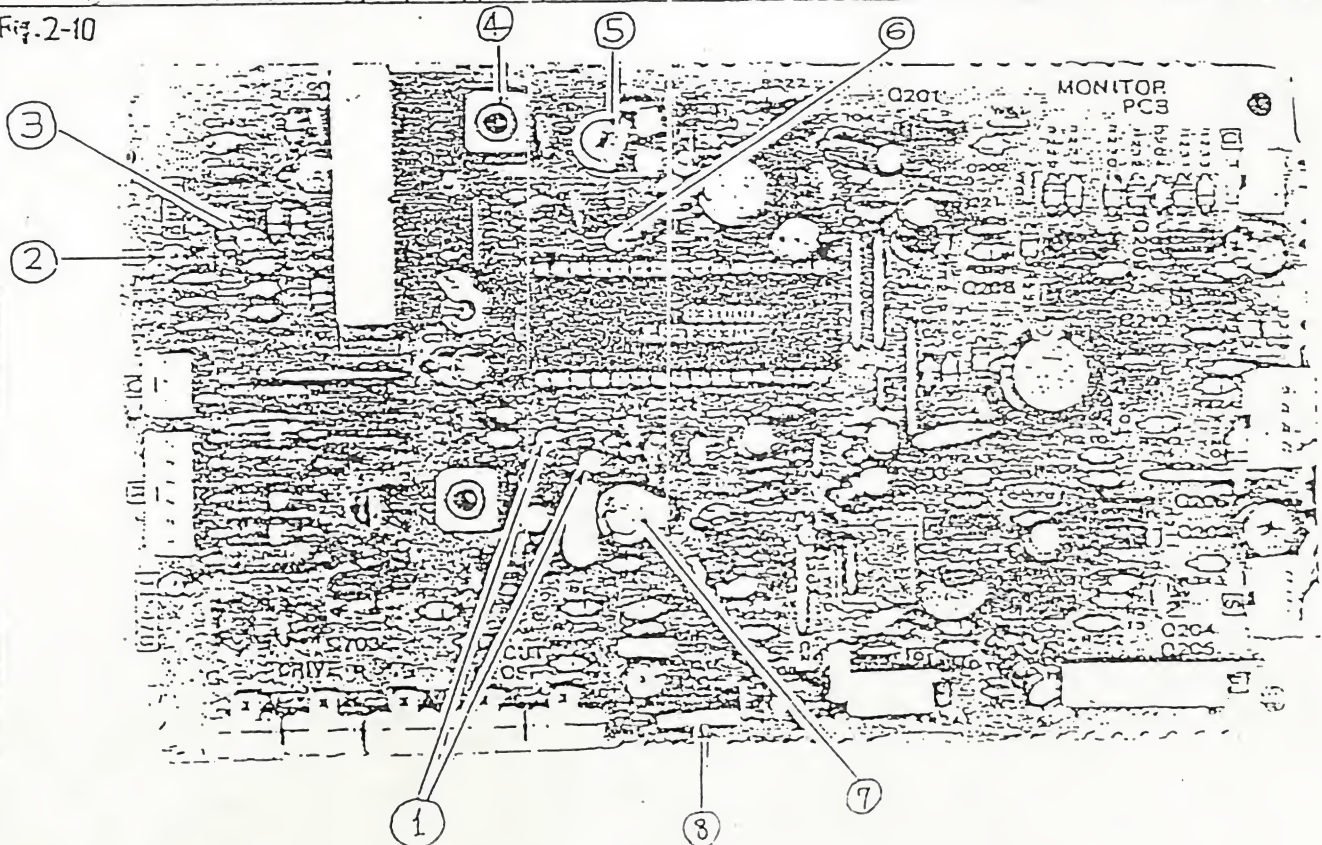


Fig. 2-9



- |                   |              |               |                 |                 |
|-------------------|--------------|---------------|-----------------|-----------------|
| ①: B1 ADJ. VR     | ③: H. Center | ⑤: TP-33      | ⑦: V. Height VR | ⑨: V. Center VR |
| ②: Sub. H. Center | ④: TP-91(B-) | ⑥: H. Held VR | ⑧: V. Lim. VR   | ⑩: TP-35A/B     |

Fig. 2-10



- |             |                        |             |                              |
|-------------|------------------------|-------------|------------------------------|
| ①: TP-46A/B | ③: TP-48               | ⑤: DLAMP VR | ⑦: C324 (Trimmer)            |
| ②: TP-49    | ④: T303 (DL.P. Trans.) | ⑧: TP-45    | ⑩: S201 (Cut off Service SW) |



# Alignment location

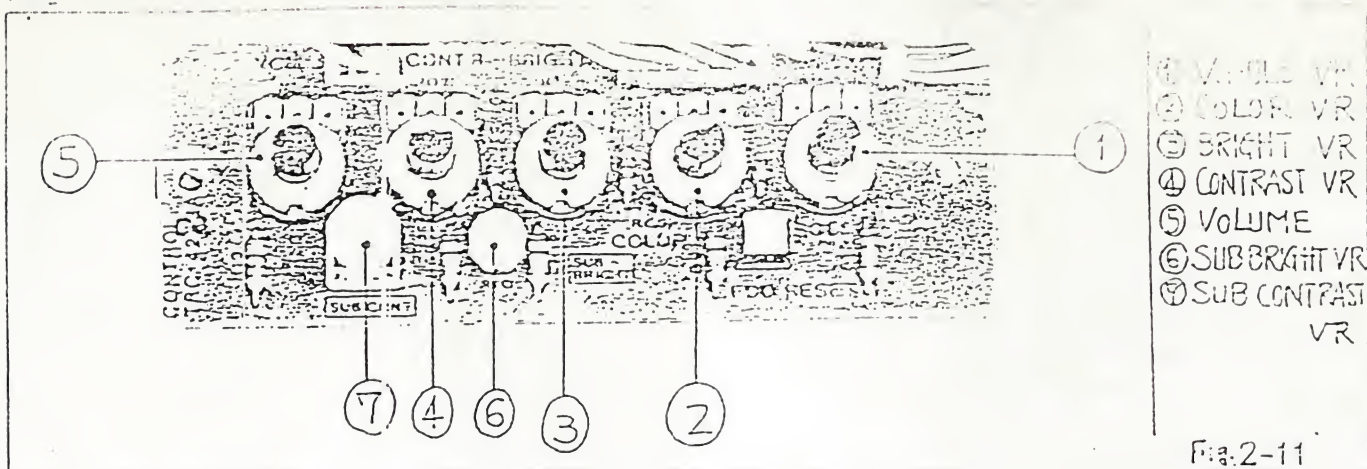


Fig. 2-11

## B1 VOLTAGE (28V)

Cutoff the picture by the bright VR (R4211) and sub bright VR (R4210).

Measure the voltage between TP-91 of the def. , power reg. and Audio out PB Assy and ground.  
Adjust B1 adj. VR (R902) to obtain 28V.

## FOCUS

Adjust the FOCUS control for best overall definition and picture detail at normal brightness and contrast.

## V. CENTER

Adjust the V. center VR (R417) to the optimum vertical picture position.

## HORIZONTAL OSCILLATOR

1. Set the H. Hold VR to the mechanical center position.
2. Connect the jumper clip between TP-33 and earth.
3. While rotating the H. Hold VR, keep the picture stationary or slowly moving.
4. Remove the jumper clip.
5. Make sure that the set maintains horizontal sync, when signals are switched.

## H. CENTER

Set the H. center switch (S85) and Sub-H. center switch (S86) to the optimum horizontal picture position.

## VERTICAL HEIGHT AND LINEARITY

1. Display a pattern which allows easy confirmation of symmetry (such as a circle or crosshatch).
2. Reduce the vertical size with the V. HEIGHT VR.
3. Adjust the vertical symmetry with the V. LIN. VR.
4. Readjust the vertical height, so that the picture extends to normal size.

## SUB CONTRAST AND SUB BRIGHT

1. Display a picture and set the contrast and bright VRs to the center click positions.
2. Adjust the sub contrast VR (R4206) and sub bright VR (R4210) for optimum display.

## COLOR SYNC

1. Display a color video signal and apply bias +10V to TP-45.
2. Connect a jumper clip between TP-46A and TP-46B.
3. Use a nonmetallic driver to turn trimmer capacitor C324.
4. Adjust so that the rolling color stripes become thick and the rolling slows or stops.
5. Remove jumper wire.
6. Confirm that color sync, is not disrupted when signals are switched.

## DL-MATRIX

1. Display a color video signal.
2. Set the oscilloscope to X-Y range, and connect its X-probe to TP-48 and its Y-probe to TP-49.
3. Connect a jumper clip between TP-46A and TP-46B. And apply bias +10V to TP-45.
4. Adjust the trimmer capacitor (C324) slightly so that the color becomes unlocked and the loops of the displayed lissajous figure appear on the scope. (Fig. 2-12)
5. Adjust the DL AMP control (R304) for the absence of loops and adjust the DL PHASE TRANSF. (T303) so that each pair of lines merge together.
6. Adjust the trimmer capacitor (C324) to just regain floating color synchronization.
7. Remove a jumper clip and bias +10V.

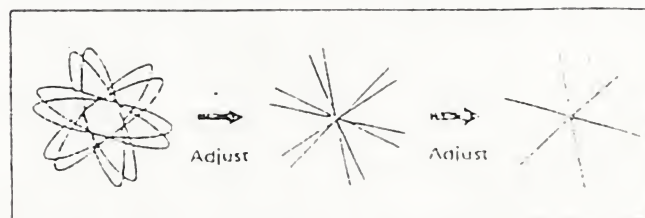


Fig. 2-12

### 3. REPLACEMENT PARTS LIST

#### PRODUCT SAFETY NOTE

Components identified by the  $\Delta$  symbol in the PARTS LIST are of special importance. Before replacing any of these components, please refer to the instructions for replacement. DO NOT degrade the safety of the set through improper servicing.

#### 1. ABBREVIATED WORD OF RESISTORS AND CAPACITORS

##### RESISTOR

CR : Carbon Resistor  
Comp. R : Composition Resistor  
OMR : Oxide Metal Film Resistor  
VR : Variable Resistor  
MFR : Metal Film Resistor  
CMFR : Coating Metal Film Resistor


FR : Fusible Resistor  
UNFR : Nonflammable Resistor



##### CAPACITOR

C Cap. : Ceramic Capacitor  
M Cap. : Mylar Capacitor  
E Cap. : Electrolytic Capacitor


BPE Cap. : Bi-Polar (or Non-Polar) Electrolytic Capacitor  
MM Cap. : Metallized Mylar Capacitor  
PP Cap. : Polypropylene Capacitor  
MPP Cap. : Metallized PP Capacitor  
PS Cap. : Polystyrol Capacitor  
Tan. Cap. : Tantal Capacitor


#### 2. FOLLOWING RESISTORS AND CAPACITORS OF STANDARD ELECTRICAL COMPONENTS ARE OMITTED FROM THIS PARTS LIST. EACH PART NUMBER OF THESE STANDARD REPLACEMENT COMPONENTS IS DEFINED AS FOLLOWS.




Carbon Resistor (C R): Lead form (  )

Rating	Part No.
$\frac{1}{2}W$	QRD141J-  Constant term CR $\frac{1}{2}W$ Tolerance Lead form
$\frac{1}{4}W$	QRD121J- 




Composition Resistor (Comp. R): Lead form (  )


Rating	Part No.
$\frac{1}{2}W$	QRC121K-  Constant term Comp. R $\frac{1}{2}W$ Tolerance Lead form






Mylar Capacitor (M Cap.): Lead form (  )

Withstand Voltage	Part No.
50V	QFM41HK-  Constant term M Cap. 50V Tolerance
100V	QFM42AK- 
200V	QFM42DM- 

Ceramic Capacitor (C Cap.): Lead form (  )

Withstand Voltage	Parts No.
25V	QCS11EJ-  Constant term C Cap. 25V Tolerance
50V	QCS11JP- 
500V	QCS12HP- 

Electrolytic Capacitor (E Cap.): Lead form (  )


Withstand Voltage	Parts No.
6.3V	QET40JR-  Constant term E Cap. 6.3V Tolerance
10V	QET41AR- 
16V	QET41CR- 
25V	QET41SR- 
50V	QET41HR- 

#### 3. DECODING OF TOLERANCE AND CONSTANT TERM










J:  $\pm 5\%$  K:  $\pm 10\%$  M:  $\pm 20\%$  N:  $\pm 30\%$  H:  $+50\%$  Z:  $+80\%$  P:  $+100\%$  A:  $+100\%$  R:  $+30\%$   
-10% -20% -0% -10% -10%

##### CONSTANT TERM


• Carbon Resistor ( $\frac{1}{2}W$ ,  $\pm 5\%$  Tolerance)

QRD141J-










CONSTANT TERM

-         
1 R 0 - 1.0 $\Omega$  47k $\Omega$  - 47 x 10<sup>3</sup> - QRD141J-473  
9 R 7 - 9.7 $\Omega$   
1 0  - 10 $\Omega$  means 10 x 10<sup>2</sup> ( $\Omega$ )  
8 2  - 82 $\Omega$  means 82 x 10<sup>3</sup> ( $\Omega$ )

• Ceramic Capacitor (50 Volts,  $\pm 5\%$  Tolerance)

QCS11HJ-

CONSTANT TERM

-         
1 R 0 - 1.0pF 680pF - 68 x 10<sup>1</sup> - QCS11HJ-681  
8 R 0 - 8.0pF 3.3uF - 33 x 10<sup>1</sup> - QCS11HJ-335  
1 0  - 10 $\Omega$  means 10 x 10<sup>2</sup> (pF)  
8 8  - 88 $\Omega$  means 88 x 10<sup>3</sup> (pF)



## TRC-1223A-1 (VIDEO &amp; CHROMA PCB ASSY) 1/2

REV 02-80

SYMBOL NO.	PART NO.	PART NAME	REMARKS
VARIABLE RESISTOR			
R1394	CEX40033-000	V.F. DL AMP	
1701	A75557-103	" (B. CUT OFF)	10k $\Omega$
1704	" -103	" (R. CUT OFF)	"
1706	" -221	" (R. DRIVE)	220 $\Omega$
1707	" -103	" (G. CUT OFF)	10k $\Omega$
1709	" -221	" (G. DRIVE)	220 $\Omega$
RESISTOR			
R1710	QRG019J-123S	OM R	12k $\Omega$ 1W J
1712	" -123S	"	" " "
1714	" -123S	"	" " "
CAPACITOR			
C1305	QEB51HM-224M	E Cap.	0.22 $\mu$ F 50V M
1324	QAT3001-010	Trimmer Cap.	"
COIL			
L1201	A76186-1.5	Peaking Coil	1.5 $\mu$ H
1202	A49468-562	"	5600 $\mu$ H
1203	" -101	"	100 $\mu$ H
1301	A76186-8.2	"	8.2 $\mu$ H
1302	" -68	"	68 $\mu$ H
TRANSFORMER			
T1302	CE40395-001	C.W. Transf.	
1303	CE40396-001	DL P Transf.	
DIODE			
D1201	1SS133	Si. Diode	
~5			





TRC-1225A-2 (DEF. POWER SUPPLY) OUT PCB ASSY)

SYMBOL NO.	PART NO.	REMARK
VARIABLE RESISTOR		
R1409	QVZ3507-223	VR (V. H.T.) 2.2k $\Omega$
1413	" -222	" (V. LIN.) 2.2k $\Omega$
1417	" -102	" (V. CENT.) 1k $\Omega$
1508	A75557-222	" (H. HOLD) 2.2k $\Omega$
1902	CEX40054-023	" (B1 ADJ) 2k $\Omega$
RESISTOR		
R1917	QRG019J-152S	0 M R 1.5K $\Omega$ 1W J
1926	QRM024K-R22	M P R 0.22 $\Omega$ 2W K
CAPACITOR		
C1401	QEN61HM-105Z	B P E Cap. 1 $\mu$ F 50V M
1404	QEN51HM-105	" " "
1405	QFZ0083-104M	M. Cap. 0.1 $\mu$ F " K
1408	QEE51EK-105B	Tan. Cap. 1 $\mu$ F 25V "
1409	QEE51AK-226M	" 22 $\mu$ F 10V "
1410	" -226M	" " "
1412	QEU51EM-108M	E Cap. 1000 $\mu$ F 25V M
1413	QEB51HM-224M	" 0.22 $\mu$ F 50V "
1509	QFP31HJ-562S	P P Cap. 5600pF " J
1515	QFP42JJ-562S	" " 630V "
1516	" -472M	" 4700pF " "
1517	" -472M	" " "
1518	QFH52AJ-155M	M M Cap. 1.5 $\mu$ F 100V "
1519	QFP32DK-473M	P P Cap. 0.047 $\mu$ F 200V K
1520	" -473M	" " "
1528	QEN61HM-474Z	B P E Cap. 0.47 $\mu$ F 50V M
1601	QEN51HM-105	" 1 $\mu$ F " "

25432

SHEET NO.	PART No.	NAME	REMARKS
COIL			
L 1501	CE40024'-002	Hor. Lin.	
1503	CJ30030-054	Coil	"
1522	CE40140-00D	W Coil	
1901	CJ30131-00A	Power Choke	
TRANSFORMER			
T 1501	A76568-MA	H. Drive Transf.	
1502	△ CJ39587-00A	F. B. Transf.	
1531	C39084--A	Side Pin Transf.	
1901	A76567-MA	P. Drive Transf.	
DIODE			
D 1501	HZS6.8E(B2)	Zener Diode	
1502	V19E	Si. Diode	
1504	V09E	"	
~7		"	
1508	U19B(V)	"	
1601	HZS10E(B3)	Zener Diode	
1902	U19B	Si. Diode	
1903	HZS6.8E(B2)	Zener Diode	
1904	HZS12E(B)	"	
1905	HZS6.8E(B2)	"	
1906	ISS133	Si. Diode	
1907	HZS13E(B1)	Zener Diode	
1908	ISS133	Si. Diode	
1909	"	"	
TRANSISTOR			
Q 1401	2SA1015(Y,GR)	Transistor	
1501	2SC1685	Si. Transistor	
1502	2SA817A(O,Y)	"	
1503	△ 2SC2335	"	
1601	2SD1133	Transistor	





TRC-4223A (CONTROL PCB ASSY)

2506 2-82

ITEM No.	PART No.	PART NAME	QTY	REMARKS
VARIABLE RESISTOR				
R4003	CEX40088-B14	VR (COLOR)	10k $\Omega$	E
4006	CEX40304-B54	" (SUB CONTRAST)	50k $\Omega$	"
4007	CEX40089-B14	" (CONTRAST)	10k $\Omega$	"
4010	QVZ3506-223	" (SUB BRIGHT)	22k $\Omega$	"
4011	CEX40089-B14	" (BRIGHT)	10k $\Omega$	"
4014	CEX40088-B14	" (VOLUME)	"	"
4016	" -B54	" (V.HOLD)	50k $\Omega$	"
OTHER				
S4001	CEX40306-001	Taca SW	FDD PRESET	



## PARTS LIST

(Check parts in the schematic)

201-021

4

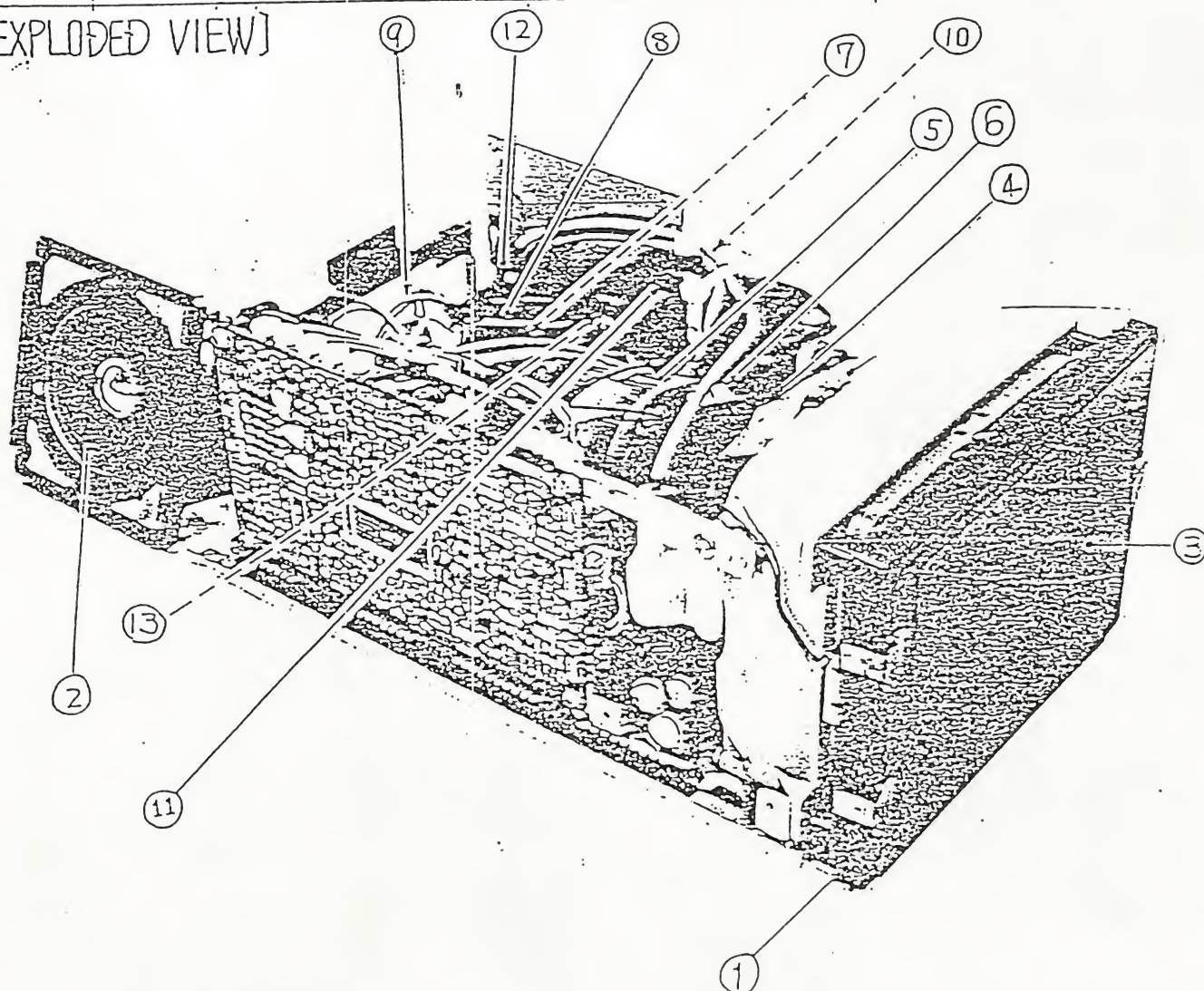
FOR HS

# CHASSIS AND CABINET PARTS LIST

230822-002

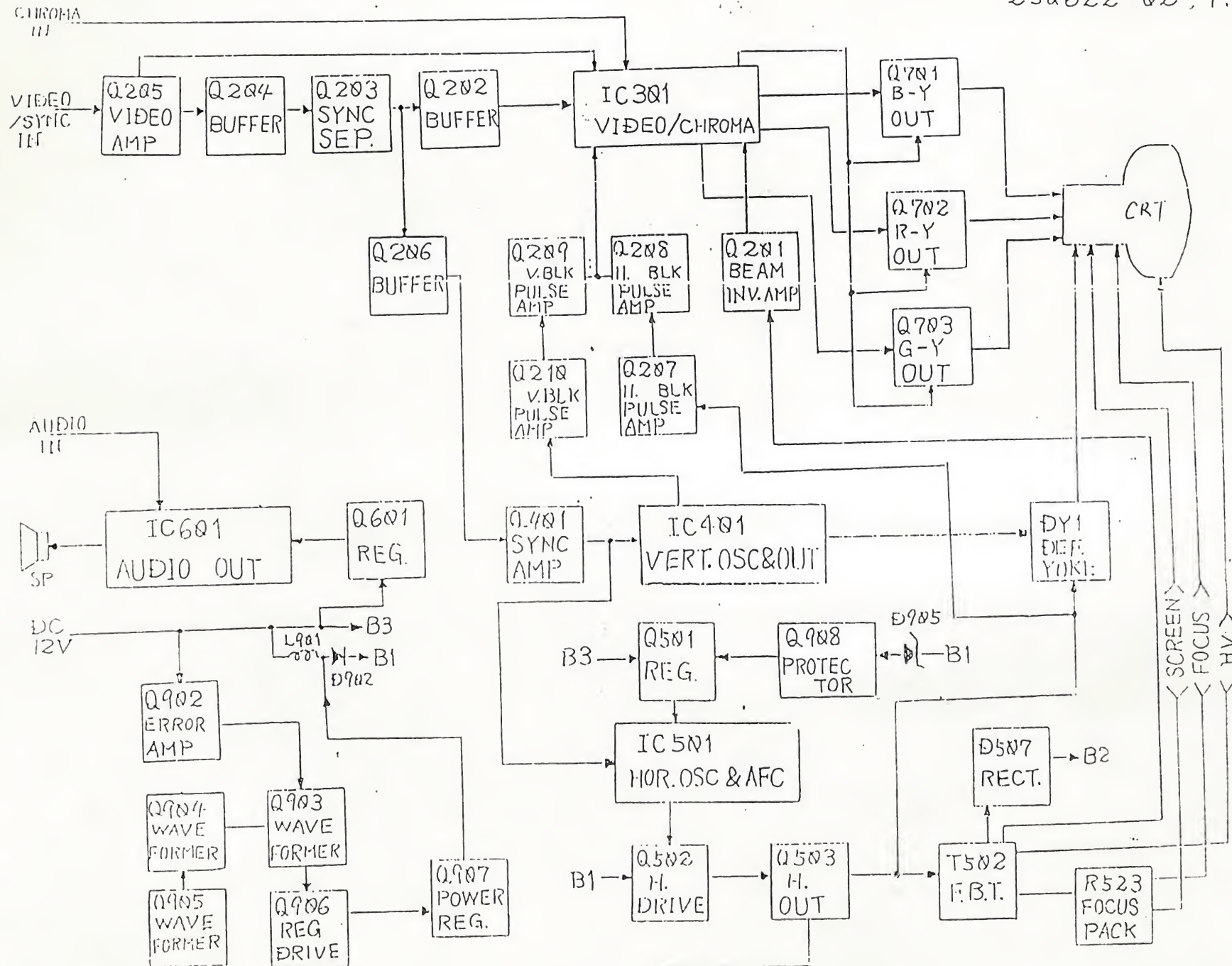
VIEW No.	SYMBOL No.	△	PART No.	PART NAME	REMARK
1			CM10022-000	Front Panel Assy.	
2			HSA0799-010	Scraper	
3			CM41779-A01	Protector Glass	
4	V01	△	150BMB22-AF	Picture Tube	
5	DY1	△	NCJ26210-00A	Def. Yoke	
6			—	Wedge	
7			—	PC Magnet	
8	T1502	△	CJ39587-000A	F. B. Transf.	
9		△	C39158-D	CRT Socket	
10	Q1907		2SD1118	Si. Transistor	Power regulator
11	R1523	△	CJ49510-257-28	Focus Pack	Focus Screen
12			A46445	Focus Cover	(X2)
13	C001	△	QCZ9217-102M	C Cap.	1000p 3kV P

(EXPLODED VIEW)



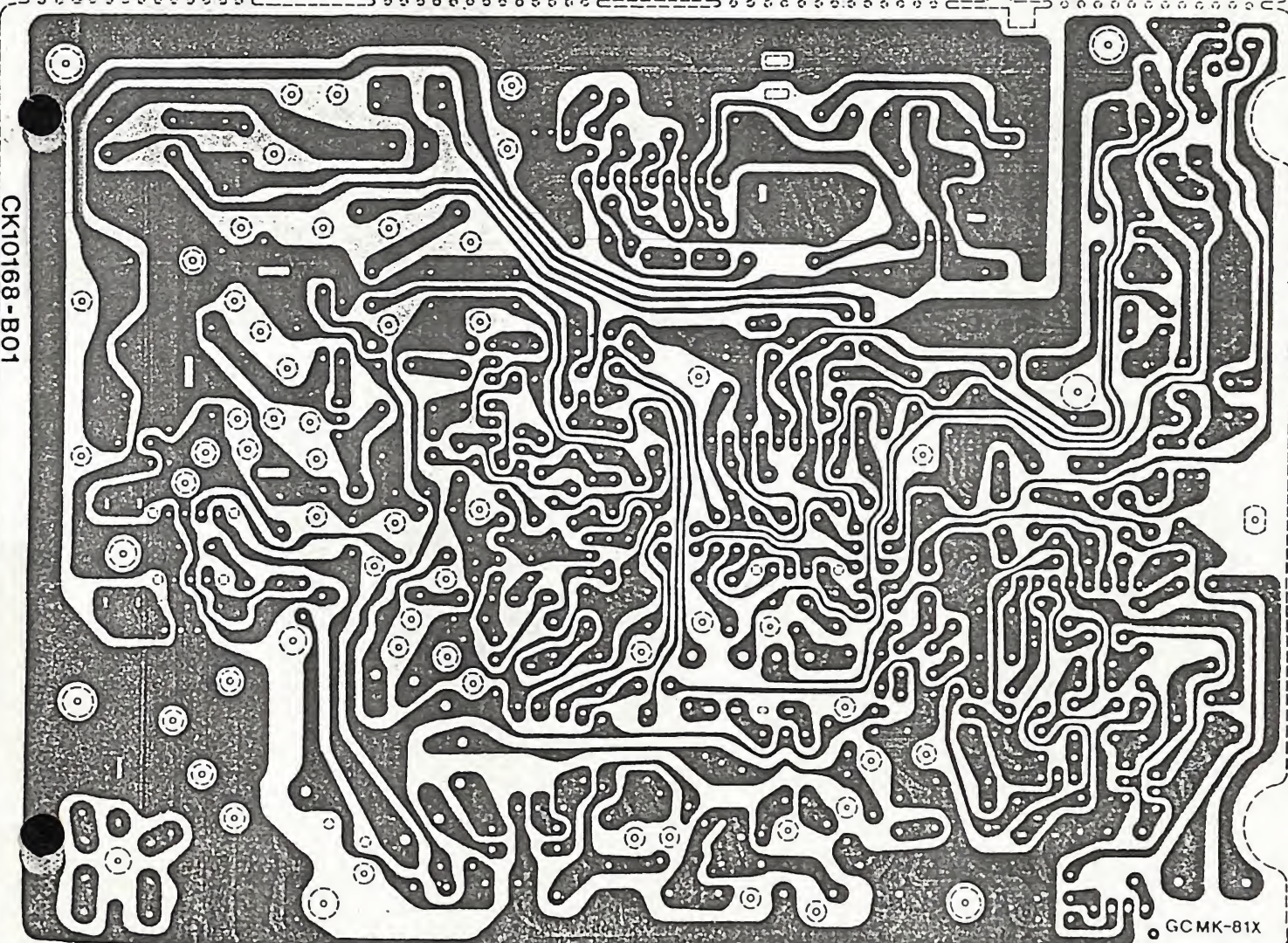
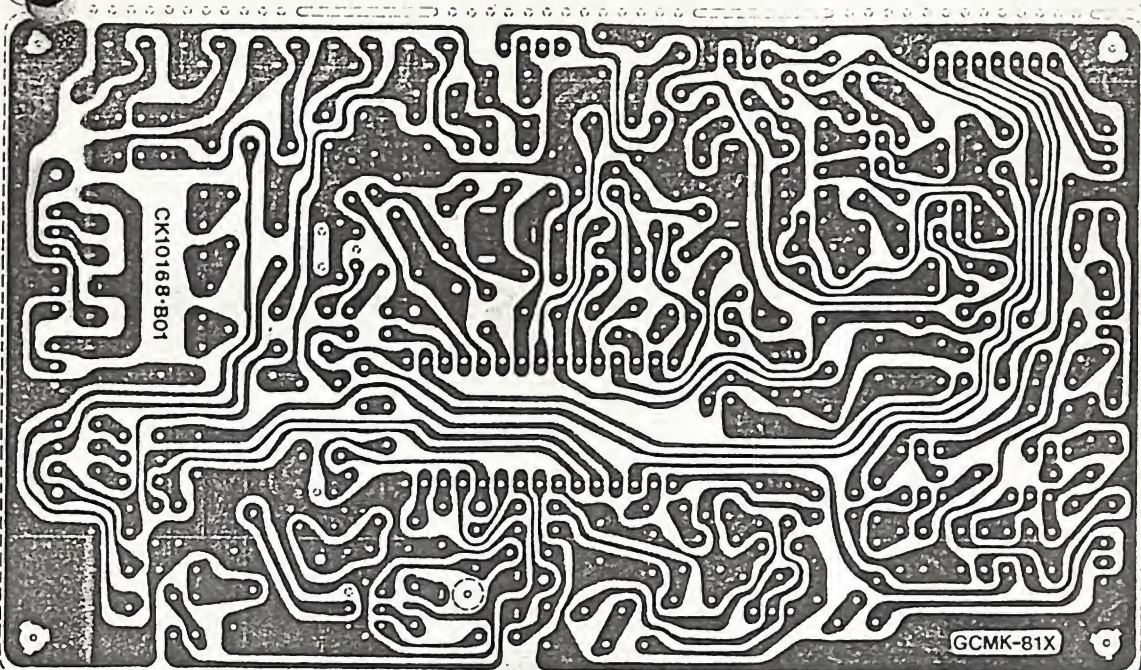
(No. 5463) 11





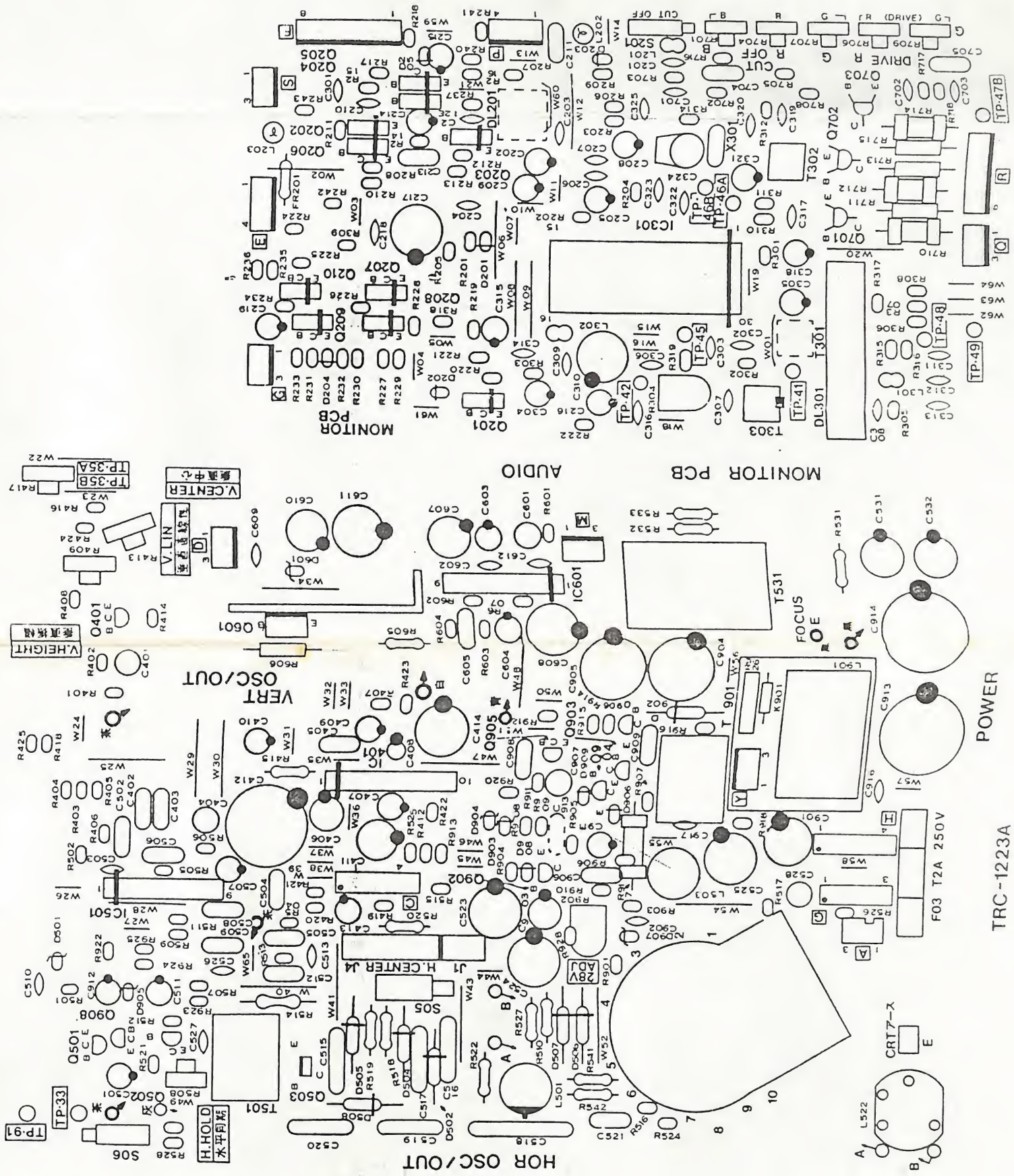






250622-02

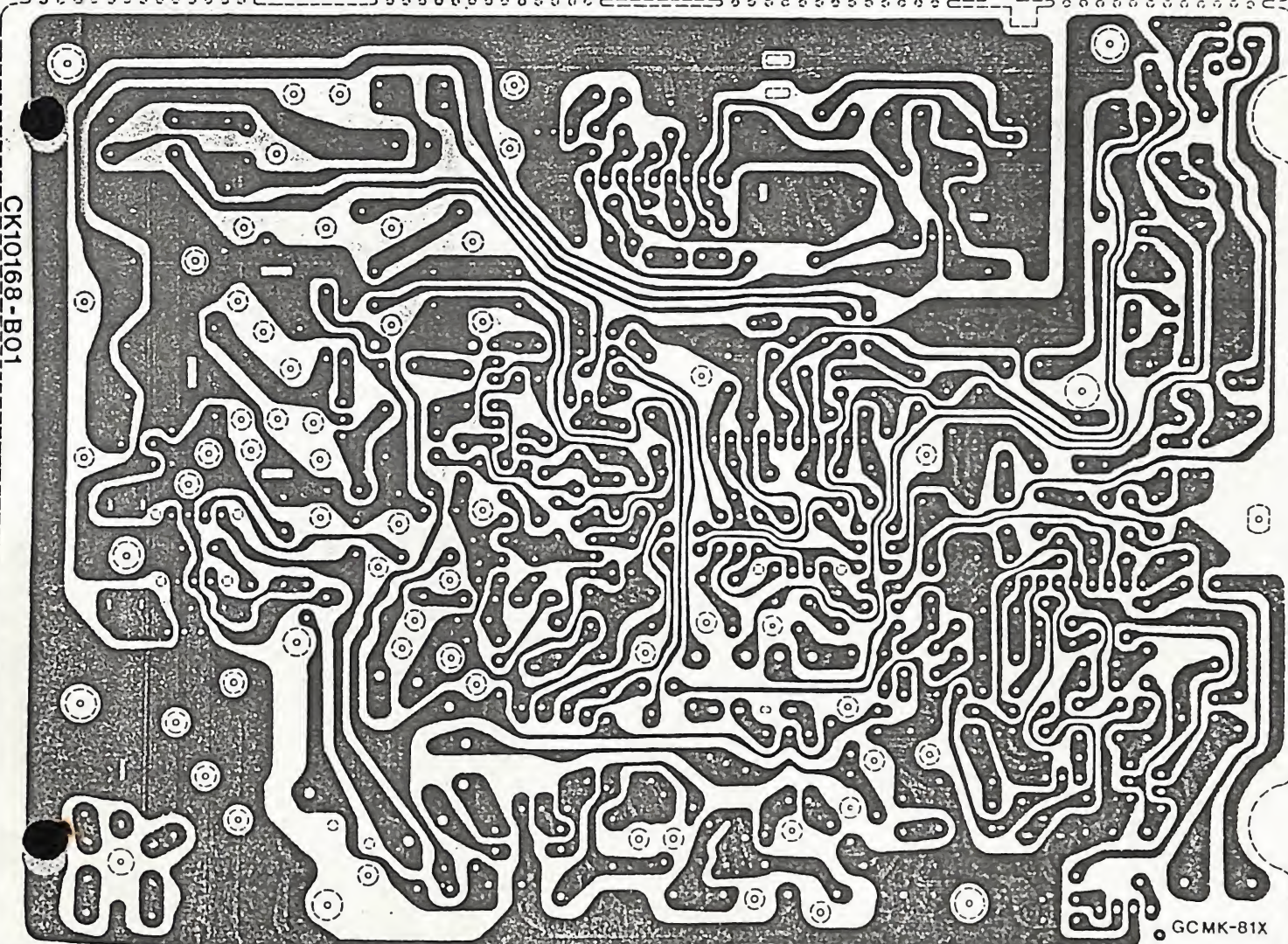
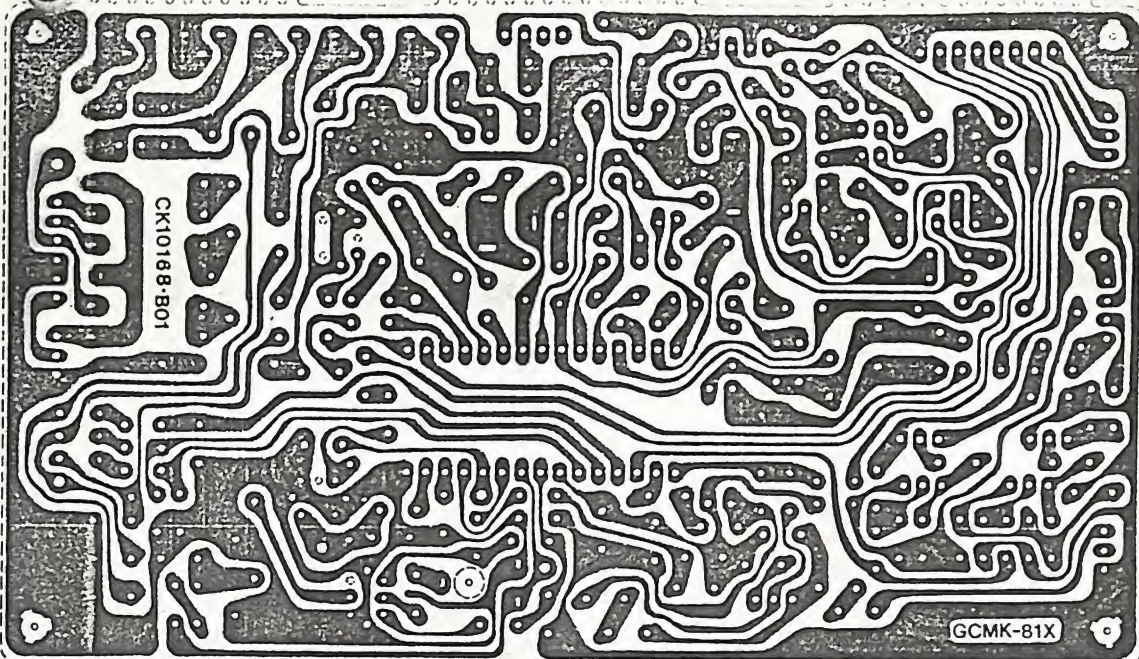








(01)

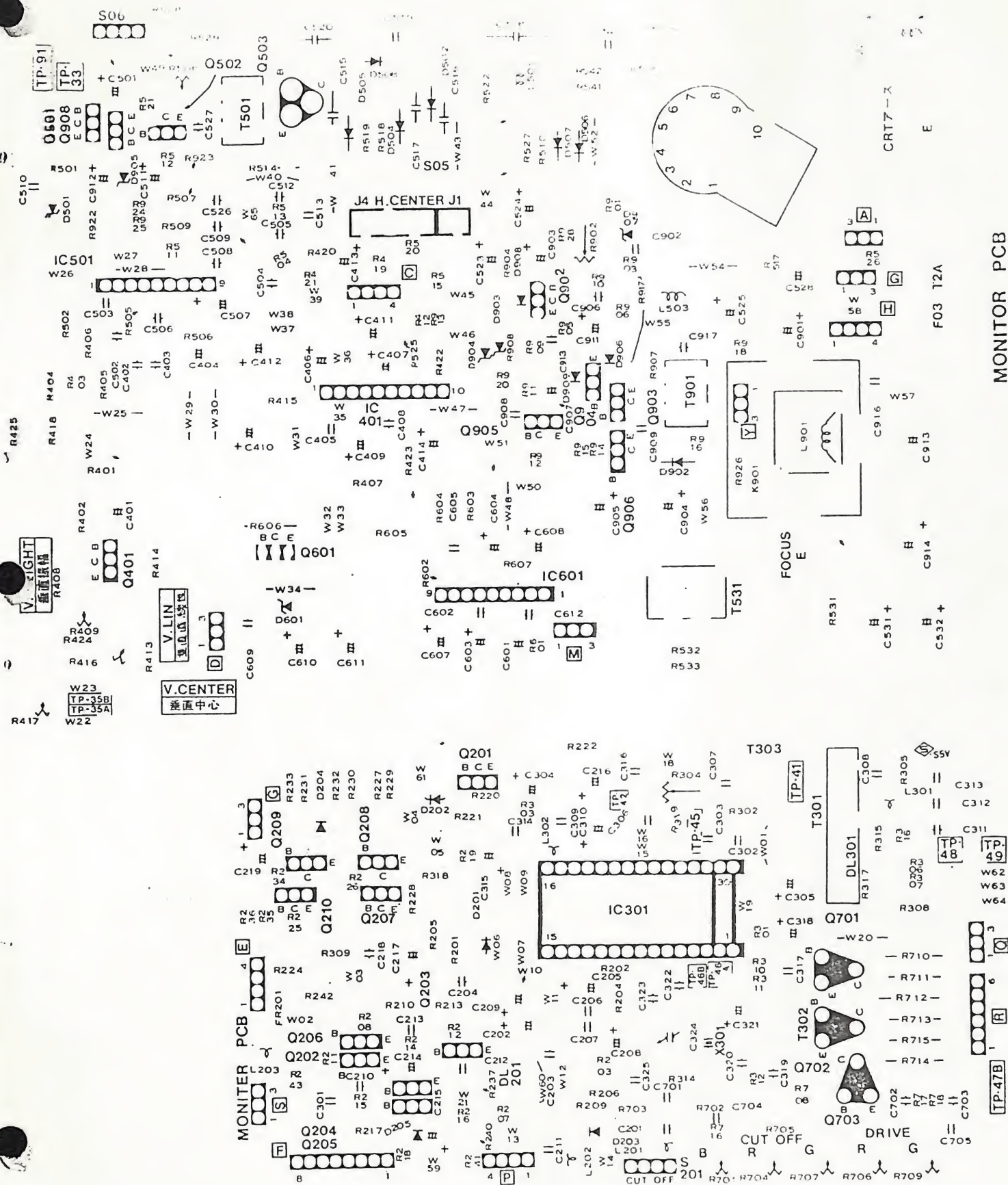


(02)

G.I.18

250622-02







## HOW TO REMOVE FOR SERVICE

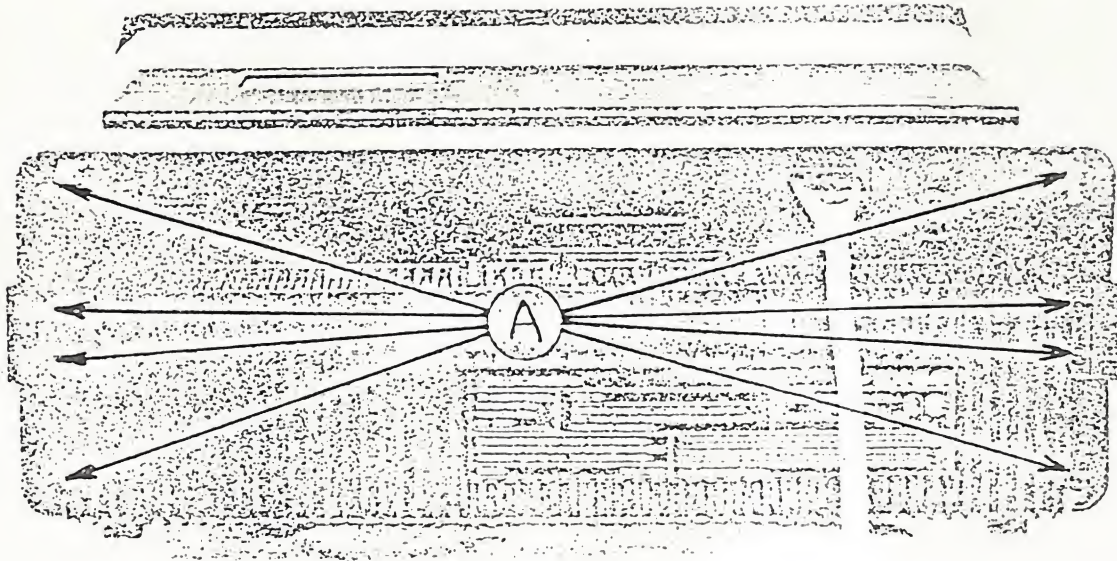


Fig. 1

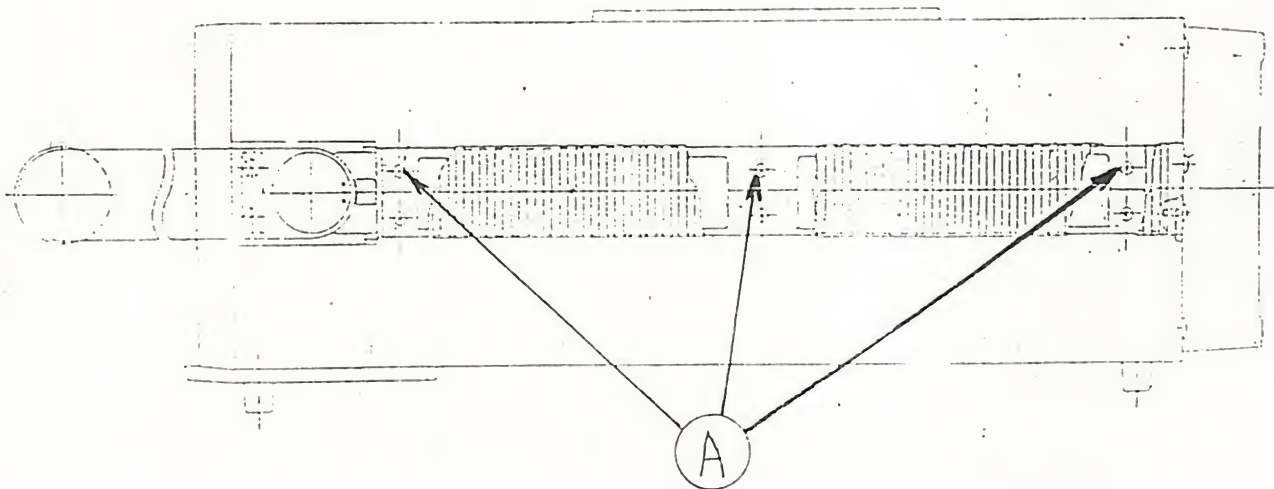


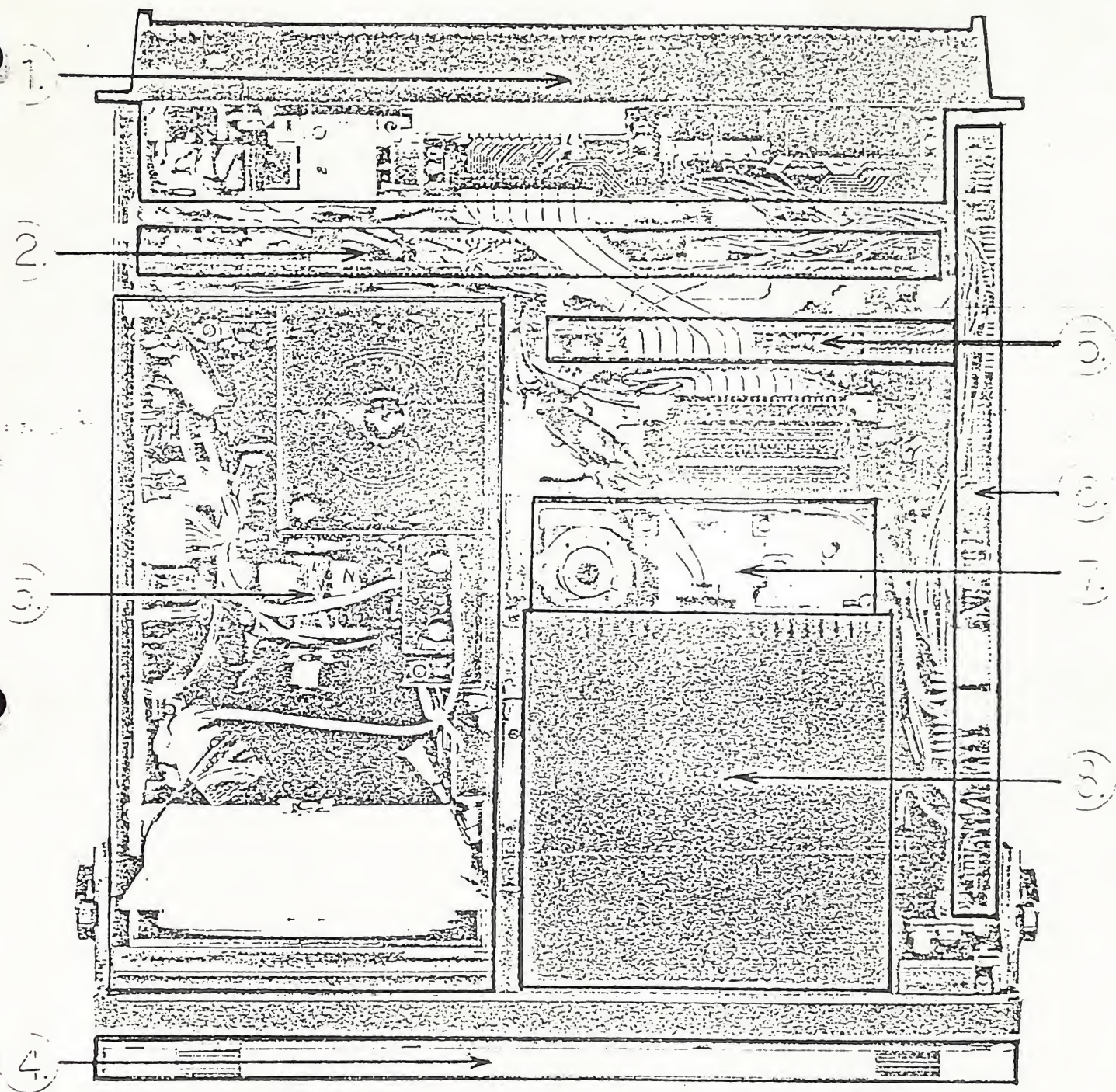
Fig. 2

How to remove the top cover assy

1. Remove six screws marked A in Fig. 1.
2. Remove two side ventilators B.
3. The top cover will come apart by removing six screws marked A (on both sides) in Fig. 2.



# DETAILS OF INSIDE

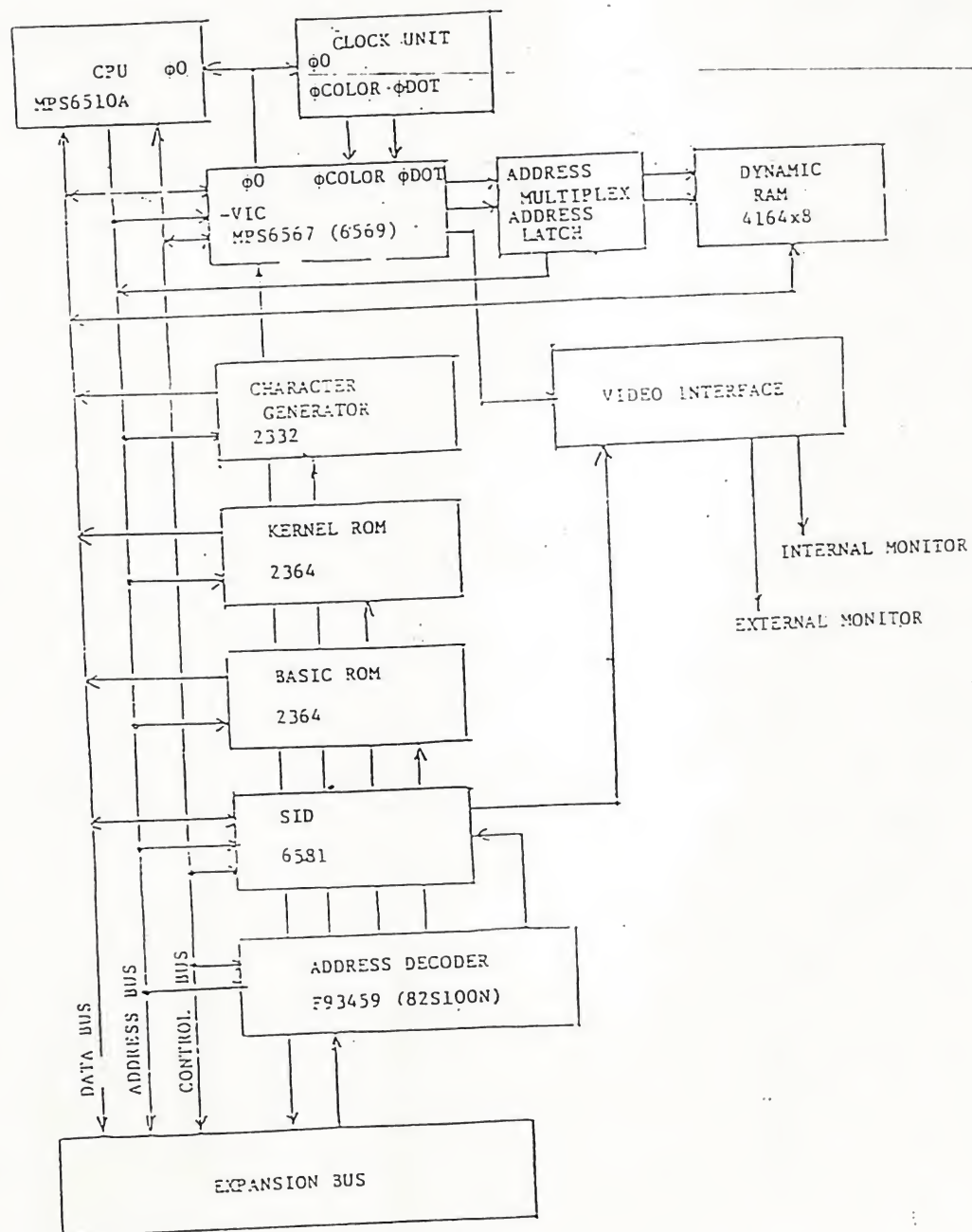


- |                         |                                  |                          |
|-------------------------|----------------------------------|--------------------------|
| 1. BACK PANNEL<br>ASSY  | 2. PCB ASSY SX-64<br>FDD CONTROL | 3. MONITOR, SX-64        |
| 4. KEY BOARD ASSY       | 5. PCB ASSY SX-64<br>I/O         | 6. PCB ASSY SX-64<br>CPU |
| 7. FLOPPY DISK<br>DRIVE | 8. DISK POCKET                   |                          |



## B. Operation of Each Block

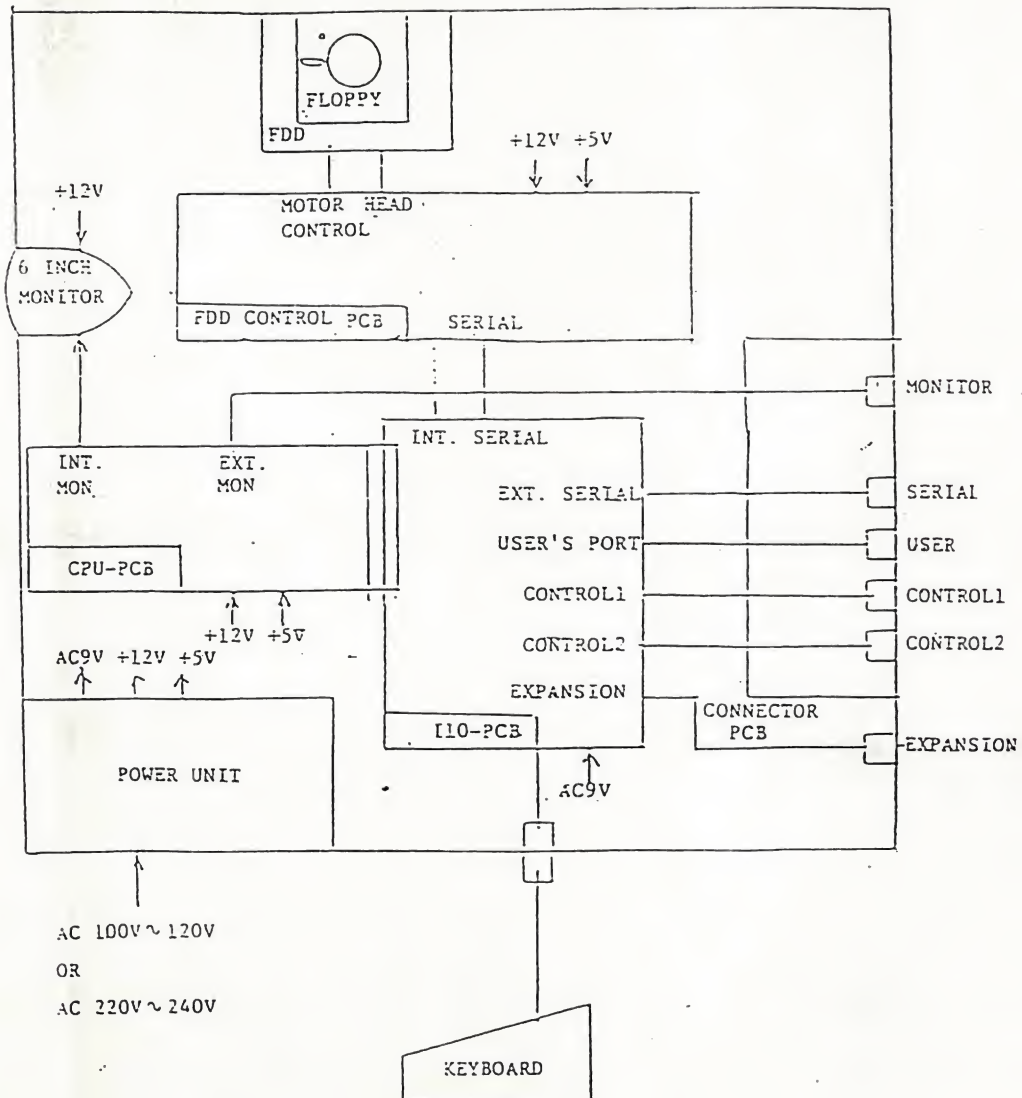
### B1. Internal block diagram of CPU-PCB





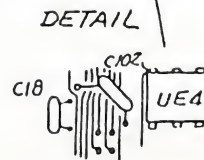
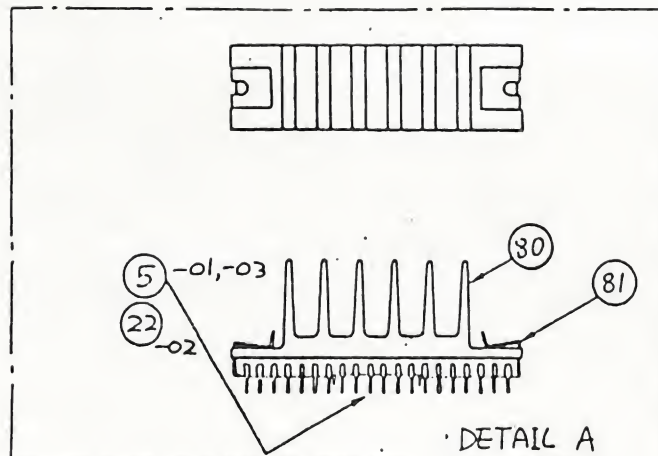
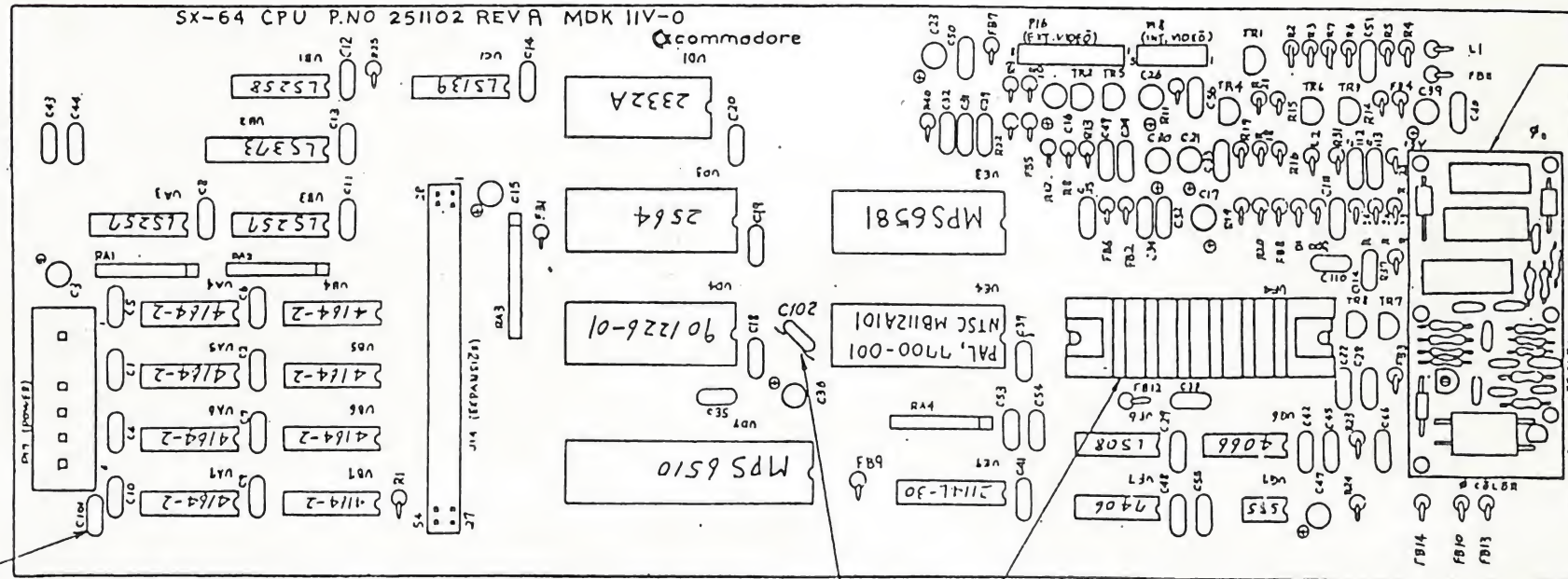
# 1. SX-64 OPERATION MANUAL

## A. Block Diagram





REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
		SEE SHEET	
			APPROVED



UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS X XX XXX L'S MATERIAL: FINISH:	DRAWN BY: T. M. Zohata	DATE: 7.25.83	<b>commodore</b>  PCB ASSY, SX-64 CPU	
	CHKD: C. H. G. A. K. A.	21.15.83		
	ENGR: R. G. J. A.	8.16.83		
	APPR: R. G. J. A.	6.27.83		
USED ON: SX-64		NEXT ASSY: Z50619	SIZE: B	REV: B
SCALE NONE			SHEET 5 OF 5	



PART NO.	DESCRIPTION
250409-01	PCB ASSY, SX-64 I/O
250409-02	PCB ASSY, SX-64 I/O FOR CSA

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	10-17-83	<i>Yokel</i>
B		REVISED PER ECO 830484	11-22-83	<i>Yokel</i>

1. SHEET 4 OF 4 SIZE B

ASSY DWG

NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	TITLE: PCB ASSY, SX-64 I/O	DRAWN BY:	DATE	ENGR:	DATE	SIZE	DRAWING NUMBER
		T. MIZOHATA	7/30/83	<i>R. Aizawa</i>	7/26/83	B	250409
		CHKD: G. HAKIYAKA	8/15/83	APPR: <i>Yokel</i>	10/27/83		SHEET 1 OF 4



QUANTITY REQD PER PART / DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										02-01						
										1						
										2						
										3	C	251107-01	SCHEMATIC DIAGRAM, SX-64 I/O			
										4						
										5	B	901522-06	IC 7406 HXE INVERTER BUFFER	UD2		
										6	B	901521-06	↑ 74LS74A DUAL D-FLIP-FLOP	UE2		
										7	B	901523-03	NE556 DUAL TIMER	UE3		
										8	B	901502-01	↓ 4066 QUAD ANALOG SW	UC1		
										9	B	906108-01	IC MPS6526 CIA	UB2,UB3		
										10						
										11	B	251108-01	CRYSTAL MODULE 60HZ	UA1	KYOSERA	
										12						
										13	B	902671-01	TRANSISTOR 2SC945	TR1		
										14						
										15						
										16						
										17	B	251071-28	CAPACITOR CERAMIC DISK 330pF/25V ±10% C7			
										18	B	251075-06	↑ 0.1μF/25V ±10% C1~5,8,9,10,11			
										19	B	900100-01	↓ ELECTROLYTIC 10μF/20V C12,C13			
										20	B	900464-36	CAPACITOR CERAMIC 0.47μF/25V C6			RADIAL
										21	B	251068-88	RESISTOR 3.3KΩ 1/4W ±5% R10,R3			
										22	B	251068-59	RESISTOR 220Ω 1/4W ±5% CARBON R1			RADIAL
										23	B	↑ -76	↑ 1KΩ	↑ R5,R6,R7		
										24	B	↓ -117	↓ 47KΩ	↓ R4,R11		
										25	B	251068-126	RESISTOR 100KΩ 1/4W ±5% CARBON R8			RADIAL
										26						
										27						
										28	B	902442-22	RESISTOR PARK 1KΩ 7-comp 8PIN RA1			
										29						
										30	B	325513-01	COIL INDUCTOR 2.2μH L1			RADIAL
										31						
										32	B	325563-01	FERRITE BEAD FB1~6			RADIAL
										33						
										34	B	904150-06	IC SOCKET 40PIN UB2,UB3			
										35						
										36						
										37						

commodore

TITLE:

PCB ASSY, SX-64 I/O

DRAWN BY:

T. M. 20

DATE

7/30/83

ENGR:

J. R. Smith

DATE

8-15-83

SIZE

B

Z50409

REV

B

SHT

2

4



QUANTITY REQD PER PART / DASH NO.												ITEM	Q	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
												-02-01						
												22	38	B	250644-06	HEADER ASSY 6P, L-ANGLE	P11, P13	MOLEX 5046-06A
													39					
												11	40	B	250644-02	HEADER ASSY 2P, L-ANGLE	P15	MOLEX 5046-06A
													41					
												11	42	B	250645-01	HEADER ASSY 24P, STRAIGHT	P12	MITSUMI
													43					
													44					
													45					
												11	46	B	250646-27	HEADER ASSY 54P L-ANGLE	P14	FUJITSU FCN-725P054-AU/L
													47					
													48					
													49					
												11	50	B	250695-20	HEADER ASSY 40P, STRAIGHT	P10	FUJITSU FCN-724P040-AU/L
													51					
													52					
													53					
												11	54	B	250647-01	HEADER ASSY 50P, STRAIGHT	P9	FUJITSU FCN-724P050-AU/L
													55					
													56					
													57					
													58					
												1	59	B	251106-01	PCB FABRICATION, SX-64 I/O		MEIKO
												1	60	B	251106-02	FABRICATION, SX-64 I/O		MEIKO FOR CSA
											RFF RFF	61	B	251436-01	ARTWORK, SX-64 I/O			
											RFF RFF	62	B	251437-01	SILKSCREEN, SX-64 I/O			
											RFF RFF	63	B	251438-01	PCB SOLDER MASK, SX-64 I/O			
													64					
													65					
													66					
													67					
													68					
													69					
													70					
													71					
													72					
													73					
													74					

commodore		TITLE: PCB ASSY, SX-64 I/O		DRWN BY: T. Mizohata	DATE: 7/30/83	ENGR: A. Gindina	DATE: 8-15-83	SIZE: B	250409	REV: B	SHT: 3/4
				CHKD: J. W. H. / S. A. P. / R. S.	DATE: 8/15/83	APPR: S. A.	DATE: 8-22-83				

commodore

TITLE:

PCB ASSY, SX-64 I/O

DRWN BY:  
T. M. Zohata

DATE  
7/30/83

ENGR:  
A. S. S. S. S.

DATE  
7-15-83

SIZE  
B

250409

REV  
B

SHT  
3

4








TABLE 1. SYSTEM DIMENSION



PART NO.	DESCRIPTION
250410-01	PCB ASSY, SX-64 FDD CONTROL
250410-02	PCB ASSY, SX-64 FDD CONTROL FOR CSA

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	10-27-83	<i>[Signature]</i>
B		REVISED PER ECO 830529	12-21-83	<i>[Signature]</i>

1. SHEET      6 OF      6 SIZE B  
 ASSY DWG  
 NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	TITLE: PCB ASSY, SX-64 FDD CONTROL	DRAWN BY:	DATE	ENGR:	DATE	SIZE	DRAWING NUMBER
		T. MIZOHATA	7/30/83	<i>[Signature]</i>	7/26/83	B	250410
		CHKD: C. HAGIWARA	7/13/83	APPR: <i>[Signature]</i>	7-27-83		SHEET 1 OF 6



QUANTITY REQD PER PART / DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										1						
										2						
										3	C	251110-01	SCHEMATIC, SX-64 FDD CONTROL			
										4						
										5	B	951435-01	IC MPS 6502A CPU	U4C4	MO5	
										6	B	901437-01	MPS 6522 VIA	U4C3, U4C5	MO5	
										7	B	325502-03	TMM 2016P RAM	U41		
										8						
										9	B	901229-05AE	2564 DOS EP-ROM	U43		
										10	B	325302-01	2364 ROM	U44		
										11	B	325572-01	GATE ARRAY	U45		
										12	B	901521-01	74LS00 QUAD NAND GATE	U42		
										13	B	-02	04 HEX INVERTER	U42		
										14	B	-30	14 HEX SCHMIT GATE	U42		
										15	B	-17	42 DECODER	U42		
										16	B	-32	86 QUAD EX-OR GATE	U43, U44		
										17	B	901521-26	74LS193 4BIT BINARY COUNTER	U45		
										18	B	901522-30	7407 HEX NONINVERT BUFFER	U44, U43		
										19	B	-01	7417 HEX NONINVERT BUFFER			SUBSTITUTE FOR ITEM 18
										20	B	901522-06	7406 HEX INVERT BUFFER	U43		
										21	B	901521-54	74LS197 4BIT BINARY COUNTER	U45		
										22	B	901522-03	74177 4BIT BINARY COUNTER			SUBSTITUTE FOR ITEM 21
										23	B	901510-01	9602 ONE SHOT MULTI	U44		
										24	B	901523-04	LM311 VOLTAGE COMPARATOR	U44		
										25	B	901523-08	NE592 VIDEO AMP	U41, U41		
										26	B	251111-01	M54532 QUAD TRANSISTOR ARRY	U42	MISTUBISHI	
										27	B	251111-02	IC ULN2064B QUAD TRANSISTOR ARRY	U42		SUBSTITUTE FOR ITEM 26
										28						
										29	B	902671-01	TRANSISTOR NPN 2SC945	TR1, TR7		
										30	B	902693-01	NPN 2SC1815			
										31	B	902720-01	PNP 2SA673	TR6		SUBSTITUTE FOR ITEM 29
										32	B	902717-01	PNP 2SA733	TR2 ~ 5		
										33	B	902744-01	TRANSISTOR PNP 2SA1015			SUBSTITUTE FOR ITEM 32
										34						
										35	B	901522-05	IC 7404 HEX INVERTER	U43		
										36						

commodore

TITLE:

PCB ASSY, SX-64 FDD CONTROL

DRWN BY:

T. Mizuhata

CHKD: C. HOSHIKAWA

DATE

7/30/83

8/15/83

ENGR:

S. Hoshino

APPR: S. Hoshino

DATE

8-16-83

8-27-83

SIZE

B

250410

REV

B

SHT

2/6



QUANTITY REQD PER PART / DASH NO.										ITEM	QS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES		
										88	37	B	900850-05	DIODE SIGNAL WQ713C	D1~6, DR. D10		RADIAL	
										55	38	B	900850-01	SIGNAL IN4148			SUBSTITUTE FOR ITEM 37	RADIAL
										11	39	B	325505-01	GENER HZ3C-2	D9		RADIAL	
										11	40	B	325506-01	DIODE GENER HZ5C-2	D7		RADIAL	
											41							
										11	42	B	325566-01	CRYSTAL MODULE 16MHZ ±50PPM				
										55	43	B	325566-02	CRYSTAL MODULE 16MHZ ±100PPM			SUBSTITUTE ITEM 42	
										11	44	B	325513-01	COIL INDUCTOR 22μH	L6		RADIAL	
										22	45	B	-02	22μH	L4.5			
										33	46	B	325513-03	COIL INDUCTOR 100μH	L1~3			
											47							
										1010	48	B	325563-01	FERRITE BEAD	FB1~10		RADIAL	
											49							
										33	50	B	900100-01	CAP. ELECTROLYTIC 10μF/25V	C18, 32, 33		RADIAL	
										11	51	B	-42	33μF/50V	C3			
										11	52	B	900100-40	ELECTROLYTIC 1μF/25V	C31			
										22	53	B	900402-17	TANTALUM 0.47μF/25V	C6, 7			
										11	54	B	251072-24	CERAMIC DISC 47PF 50V	C17			
										22	55	B	-28	330PF 50V	C15, 12			
										33	56	B	251072-32	680PF 50V	C14, 16, 5			
										22	57	B	251074-01	1000PF 25V	C9, C50			
										22	58	B	251074-09	0.022μF 25V	C10, 11			
										2525	59	B	251075-06	CAP. CERAMIC DISC 0.1μF 25V	C1, 2, 4, 8, 13	22, 23, 24, 25, 26, 27, 28, 29, 30		
											60						39, 40, 41, 34, 19, 20, 21	
										44	61	B	904150-06	IC SOCKET 40PIN	U6C4, U6C5	6502-1, 6502-2, PLA-1 (U6F5, U6C3)		
										22	62	B	904153-03	24PIN	UA4, UA1	2364-1, 2016-1		
										11	63	B	904153-04	IC SOCKET 28PIN	UA3	2364-1		
										11	64	B	250644-06	HEADER ASSY 6P, L-ANGLE	P19	MOLIX 5046-06A		
										11	65	B	250644-02	2P, L-ANGLE	P22	MOLIX 5046-02A		
										11	66	B	250644-01	5P, L-ANGLE	P20	MOLIX HIF3G-5P-2.54DS		
										11	67	B	250644-15	15P, L-ANGLE	P21	MOLIX 5046-15A		
										11	68	B	250643-06	HEADER ASSY 6P, STRAIGHT	P23	MOLIX 5285-06A		
											69							
											70							
											71							
											72							

commodore

TITLE

PCB ASSY, SX-64 FDD CONTROL

DRAWN BY

T. Mizolnta

DATE

8/15/83

ENGR

S. J. J. J.

APPR

DATE

8-16-83

SIZE

B

250410

REV

B

SHT

3

6



QUANTITY REQD PER PART / DASH NO.													ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
													1	73	B	251068-40	RESISTOR 47Ω 1/4W±5% CARBON	R50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

commodore

TITLE:

PCB ASSY. SX-64 FDD CONTROL

DRWN BY:

T. Mizohata

CHKD: C. HAGIWARA

DATE

7/30/83

8/15/83

ENGR:

A. Gishin

APPR: J.P.

DATE

8-16-83

10/27/83

SIZE

B

250410

REV

B

SHEET

4/6

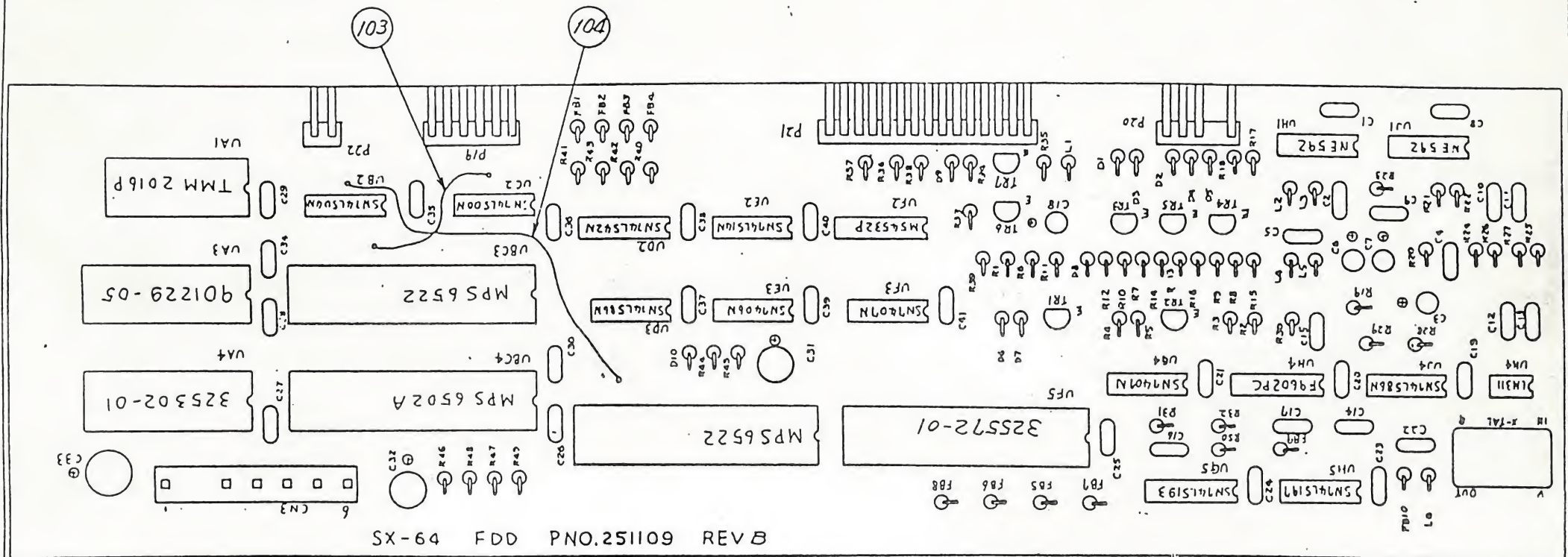


QUANTITY REQD PER PART/DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
									0201							
									S S	109	B	901521-04	1C 74LS04 HEX INVERTER	UF3		SUBSTITUTE FOR ITEM 35
									S S	110	B	901522-19	1C 7414 HEX SCH INVERTER	UF3		SUBSTITUTE FOR ITEM 35
									S S	111	B	901521-30	1C 74LS14 HEX SCH INVERTER	UF3		SUBSTITUTE FOR ITEM 35
										112						
									S S	113	B	901522-05	1C 7404 HEX INVERTER	UB2		SUBSTITUTE FOR ITEM 13
									S S	114	B	901522-19	1C 7414 HEX SCH INVERTER	UB2		SUBSTITUTE FOR ITEM 13
									S S	115	B	901521-30	1C 74LS14 HEX SCH INVERTER	UB2		SUBSTITUTE FOR ITEM 13
										116						
										117						
									S S	118	B	900850-02	DIODE SIGNAL 1S2473	DI-6,8,10		SUBSTITUTE FOR ITEM 37
									S S	119	B	-07	1S 953(3)			
									S S	120	B	-08	1S 953(7)			
									S S	121	B	900850-14	DIODE SIGNAL 1S 1588	DI-6,8,10		SUBSTITUTE FOR ITEM 37
										122						
										123						
										124						
										125						
										126						
										127						
										128						
										129						
										130						
										131						
										132						
										133						
										134						
										135						
										136						
										137						
										138						
										139						
										140						
										141						
										142						
										143						
										144						
										145						
										146						

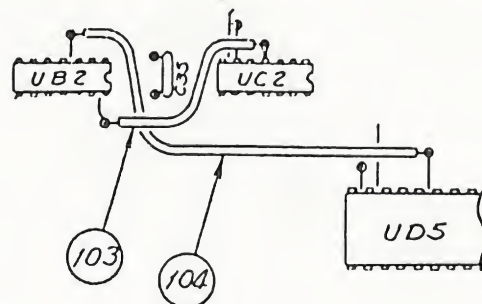
commodore	TITLE: PCB ASSY, SX-64 FDD CONTROL	DRAWN BY: R. Jida	DATE 12-20-83	ENGR:	DATE	SIZE B	DRAWING NUMBER 250410	REV B
		CHKD:		APPR:			SHEET 5 OF 6	



REVISIONS				DATE	APPROVED
LTR	ZONE	DESCRIPTION			
		SEE SHEET			



DETAIL OF ITEM 103 & 104 SOLDERING

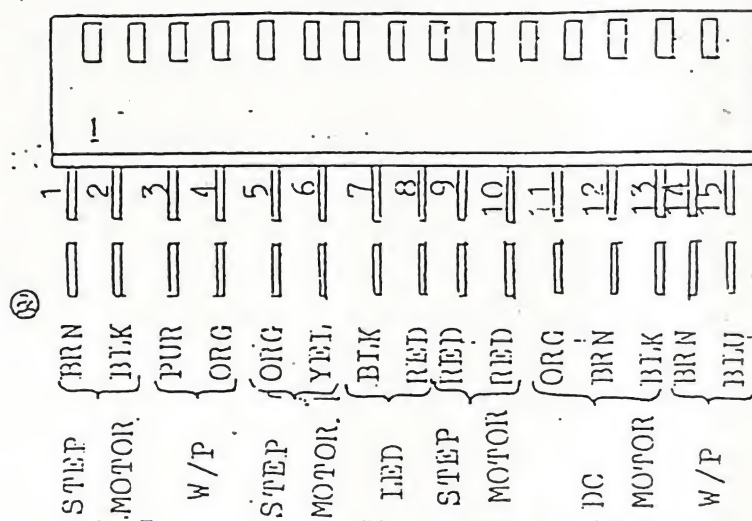


UNLESS OTHERWISE SPECIFIED TOLERANCES ON DECIMALS:		DRAWN BY: T.M. [Signature]		DATE: 7/12/83	
X .XX .XXX .4"		CHKD: C. [Signature]		8/15/83	
		ENGR: J. [Signature]		8-16-83	
		APPR: J. [Signature]		11-27-83	
MATERIAL:		USED ON:		NEXT ASSY:	
FINISH:		SX-64		250410	
commodore					
PCB ASSY;					
SX-64 FDD CONTROL					
SIZE:		B		REV B	
SCALE:		NONE		SHEET 6 OF 6	



## FUNCTION

Nail to lock

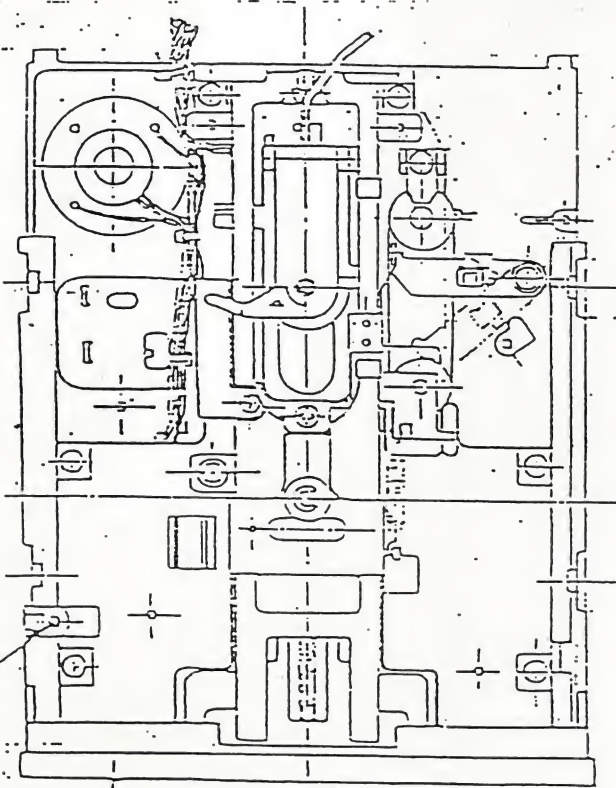


```

DC MOTOR { BLK RETURN
           BRN +12V
           ORG MOTOR ON

```

```
STEP MOTOR { RED +12V
              RED +12V
              YEL C
              ORG A
              BLK B
              BRN D
```



W/P  
TRANSISTOR  
ORG(+)  
PUR(-)  
DIODE  
BRN(+)  
BLU(-)

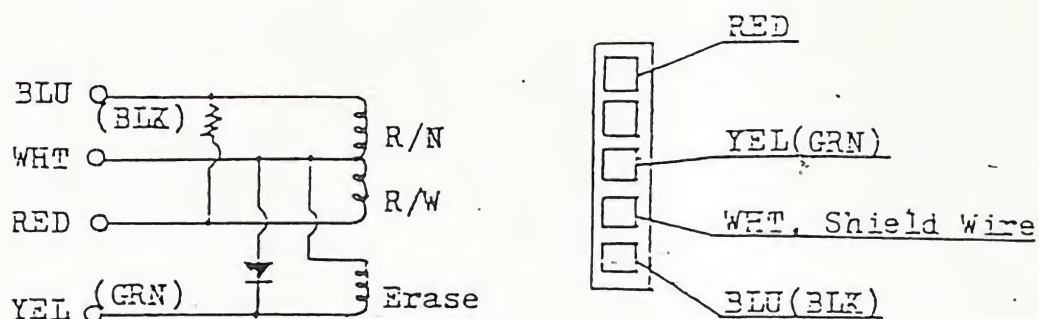
$$\begin{array}{r} \text{LED} \\ \hline \text{RED} \left( \begin{array}{c} + \\ - \end{array} \right) \\ \text{BLK} \left( \begin{array}{c} + \\ - \end{array} \right) \end{array}$$

\* Recommended connector  
Molex ~~5054NA~~ 5046NA  
5045NA

						APPO.	CHKD.	DSCD.	TITLE	FILE
								Jul 22 '61		
								Y. High	DOCUMENT NO.	( / )
PAGE	SYMB.	DATE	APPO.	CHKD.	DSCD.					

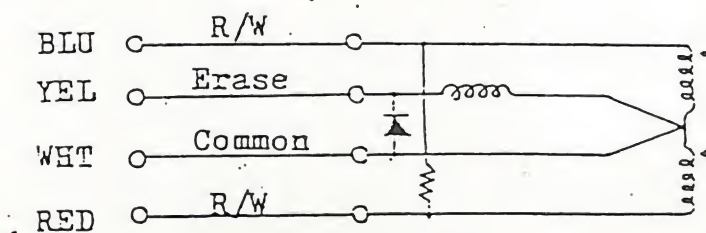
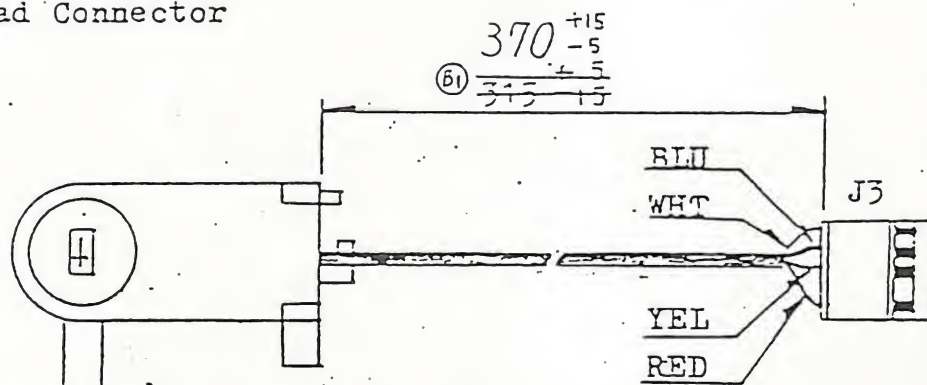


# Connector Pin

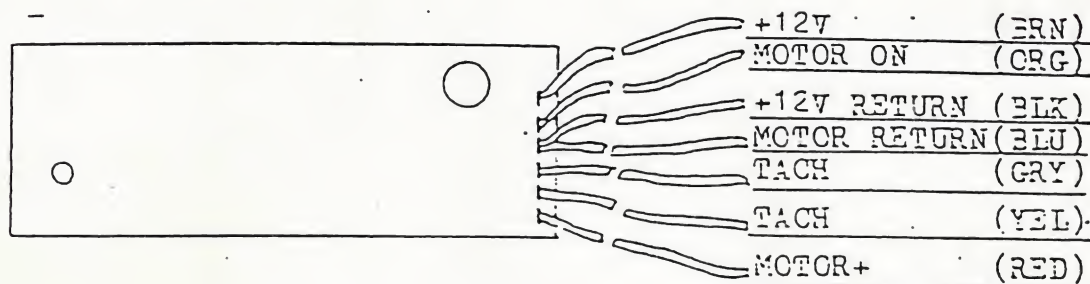


Housing  
Hirose HIF3G-5S-254C  
Terminal  
Hirose HIF3-2428SCFA

# Head Connector



# DC Motor Control P.C.B

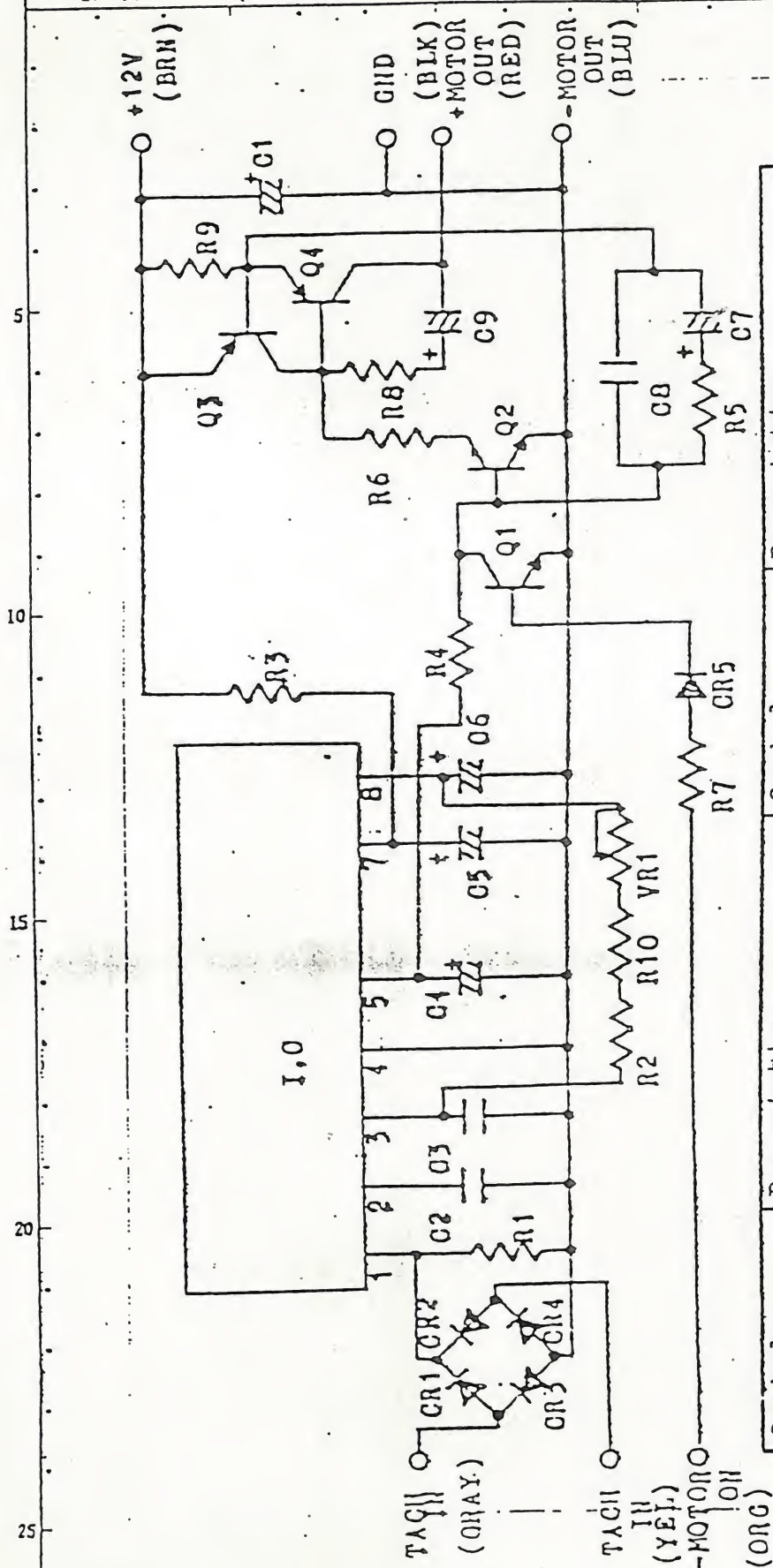




CLASS. NO.

TITLE

Motor control assembly



Symbol	Description	Symbol	Description
I.O.	IX-065B	R8	Resistor, 150 $\Omega$ /4W
Q1	Transistor	R9	Resistor, 0.68 $\Omega$ 2W
Q2	Transistor	R10	Resistor, 5.1k $\Omega$ /8W
Q3	Transistor	VR1	Variable Resistor, 20K $\Omega$
Q4	Transistor	C1, 5, 6	Capacitor, 10 $\mu$ F35V
CR1, 2, 3, 4, 5	Diode	C2	Capacitor, 0.0047 $\mu$ F50V
R1, 7	Resistor, 1k $\Omega$ /4W	C3	Capacitor, 0.033 $\mu$ F50V
R2	Resistor, 68k $\Omega$ /4W	C4, 9	Capacitor, 0.47 $\mu$ F35V
R3	Resistor, 220 $\Omega$ /4W	C7	Capacitor, 2.2 $\mu$ F16V
R4	Resistor, 3.3k $\Omega$ /4W	C8	Capacitor, 0.068 $\mu$ F50V
R5	Resistor, 2.7k $\Omega$ /4W		
R6	Resistor, 820 $\Omega$ /4W		

APPD.

CHKD.

DSGD.

TITLE

PAGE SYMBOL DATE APPD. CHKD. DSGD.

DOCUMENT NO.



ALPS ELECTRIC CO., LTD.

(株) Alps 電気 株式会社

3089-A 4 32 4 500 3







NO.	PART NO.	NAME	NO.	PART NO.	NAME	NO.	PART NO.	NAME
1	BH212-A	Door Assy.	25	HY616	Guide Shaft Keeper	49	GR123	Band
2	HY623	Collar	26	EY142	Guide Shaft	50	QY153-A	Stepper Assy.
3	WS114	Clamp Spring	27	HY712	Hinge Spring	51		
4	GW115	Wave Washer	28	BG111	LED Holder	52		
5	GW114	Thrust Washer	29	BH131	Front Panel	53		
6	BJ122-A	Collet Assy.	30	2A121064	Screw	54		
7	WS142	Hub Spring	31	DE111-AG	LED Assy..	55		
8	BJ112	Hub	32	BG211	LED Holder Ring	56		
9	EY114	Hub Shaft	33	VY119	Housing	57		
10	WS171	Door Spring	34	GR134	Steel Belt	58		
11	2L003001	E-Washer	35	GW118	Washer	59		
12	GR111	Drive Belt	36	QY124-D	Head Assy.	60	2A271030	Screw
13	HY581	Hub Support	37	2A331050	Screw	61	2LFD0011	Washer
14	FY117	Hub Frame	38	WS157	Eject Spring	62		
15	2A151040	Screw	39	HY532-A	Eject Assy.	63		
16	2G102602	Washer	40	GW123	Poly Slider	64		
17	HY582-A	Arm Support Assy.	41	2A341060	Screw	65		
18	2A132040	Screw	42	HY551	Carriage Stopper	66	2M313001	C-Washer
19	HY625	Collar	43	BG262-A	Disk Guide-R Assy.	67	GP114	Eject Pin
20	2A131050	Screw	44	PY133AA	Motor Control P.C.B	68		
21	BG261-AL	Disk Guide-L Assy.	45	GR152	Cord Holder	69		
22	EY182	Spindle Unit	46	UP512	Spindle Pulley	70		
23	GU127	Spindle Bearing	47	GT111	Tacho Disk	71	JS482	Pad Holder.
24	UP533-A	Tension Pulley Assy.	48	QY112	D.C Motor	72	GS112	Pressure Pad
						73	2A151030	Screw

				UNIT		SCALE		MODEL NO.	
				APPD.		CHKD.		TITLE	
				JAN 18 '84		JAN 18 '84		EXPLODED VIEW	
				D. D. H. H. H.		A. TAKAHASHI		DOCUMENT NO.	
								(2/2)	



## 1, specifications

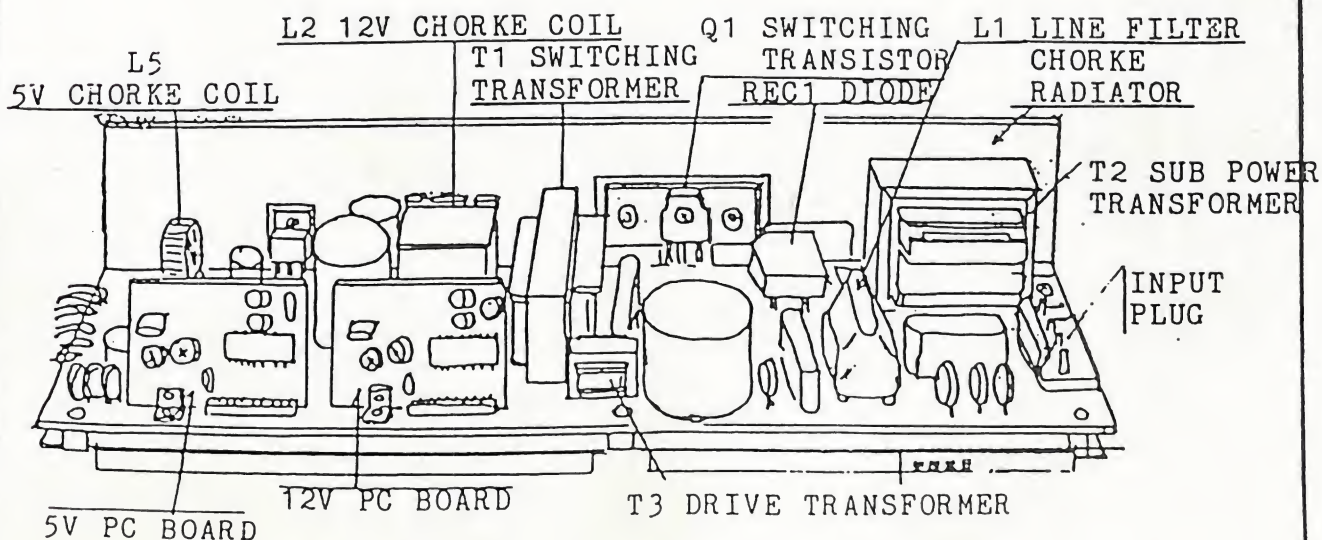
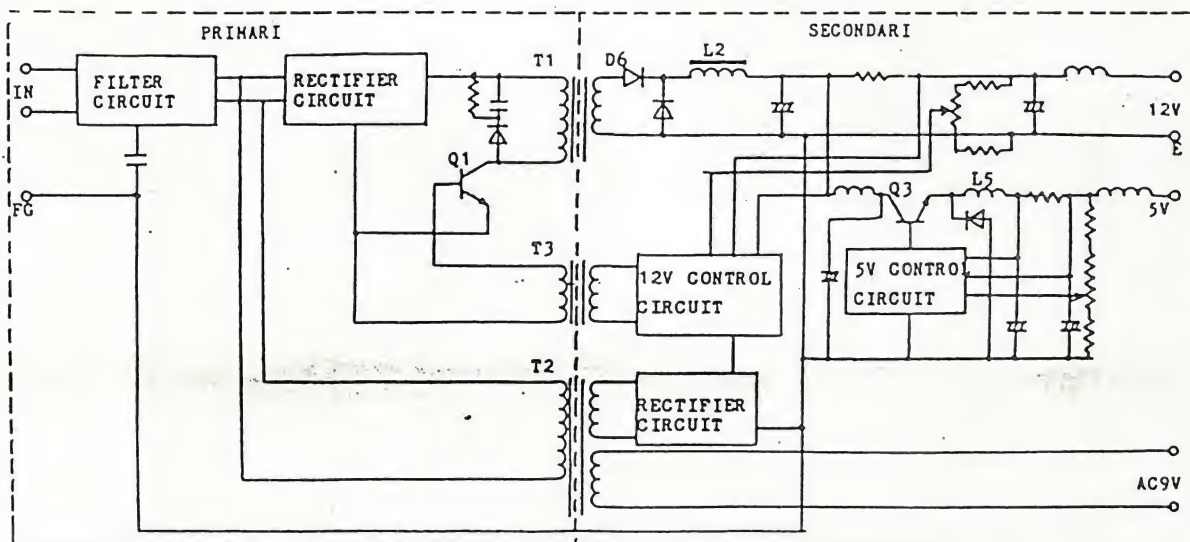
## 1-1 INPUT

1-1-1	VOLTAGE	AC 230V 10% 50.60Hz
1-1-2	POWER	75W typ
1-1-3	SURGE CURRENT	25A max

## 1-2 OUTPUT

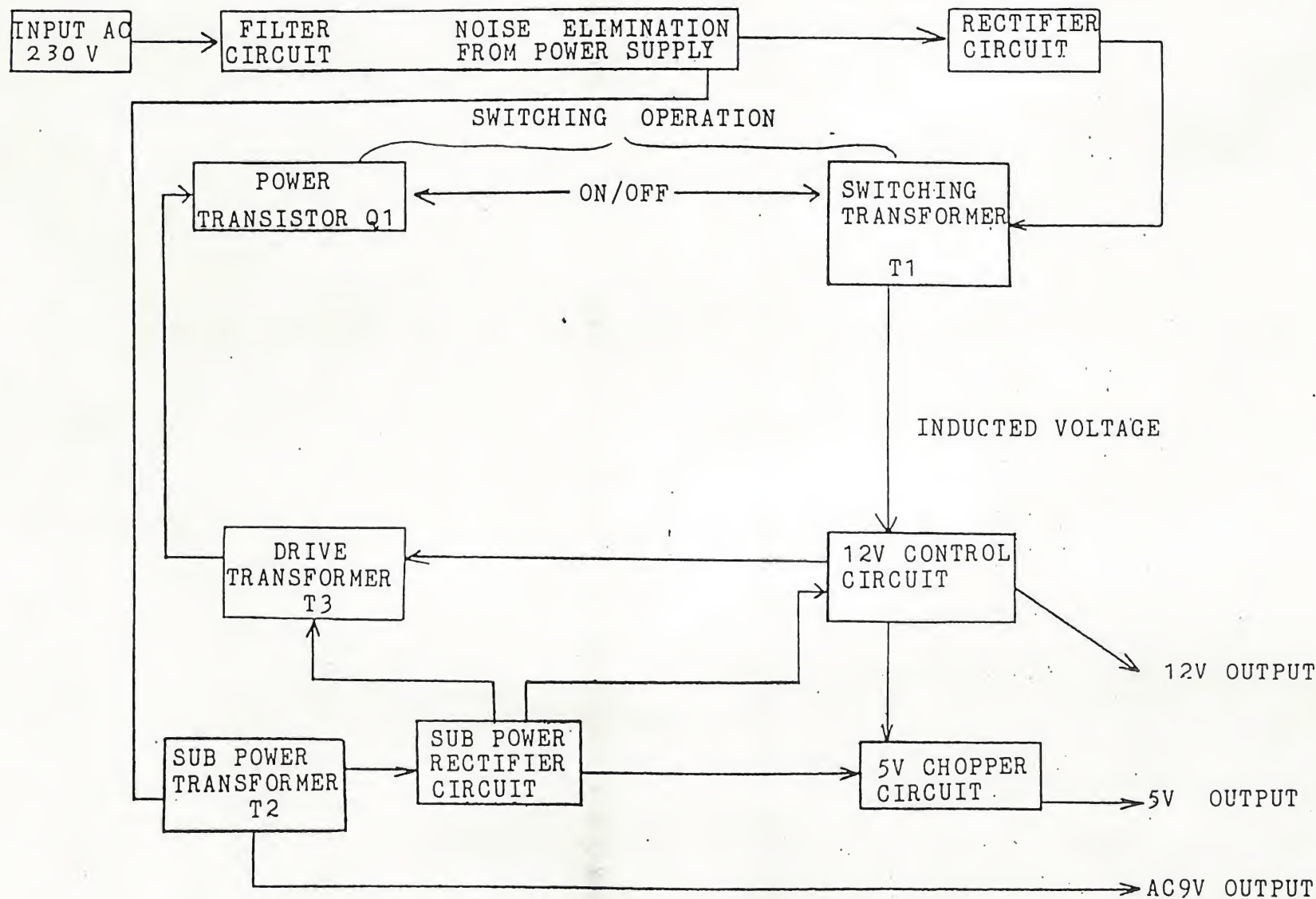
1-2-1	VOLTAGE	5V 2% , 12V 2% , AC9V 3%
1-2-2	CURRENT	5V; 3.15A , 12V; 2.76A , AC9V; 200mA
1-2-3	VARIATION	5V 3% , 12V 5% , AC9V 15%
1-2-4	RIPPLE	5V; 150mV(p-p) , 12V; 290mV(p-p)
1-2-5	OVER CURRENT PROTECTION	5V ; 3.6~4A 12V ; 3.6~4A

## 2, CIRCUIT





BLOCK DIAGRAM

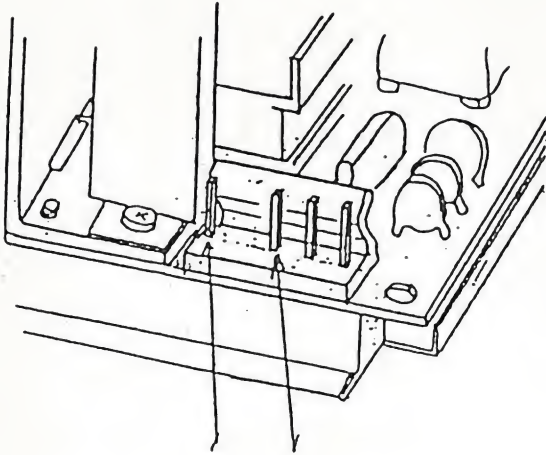




## 3, ALIGNMENT INSTRUCTION

## 1.INPUT OUTPUT CONNECTION

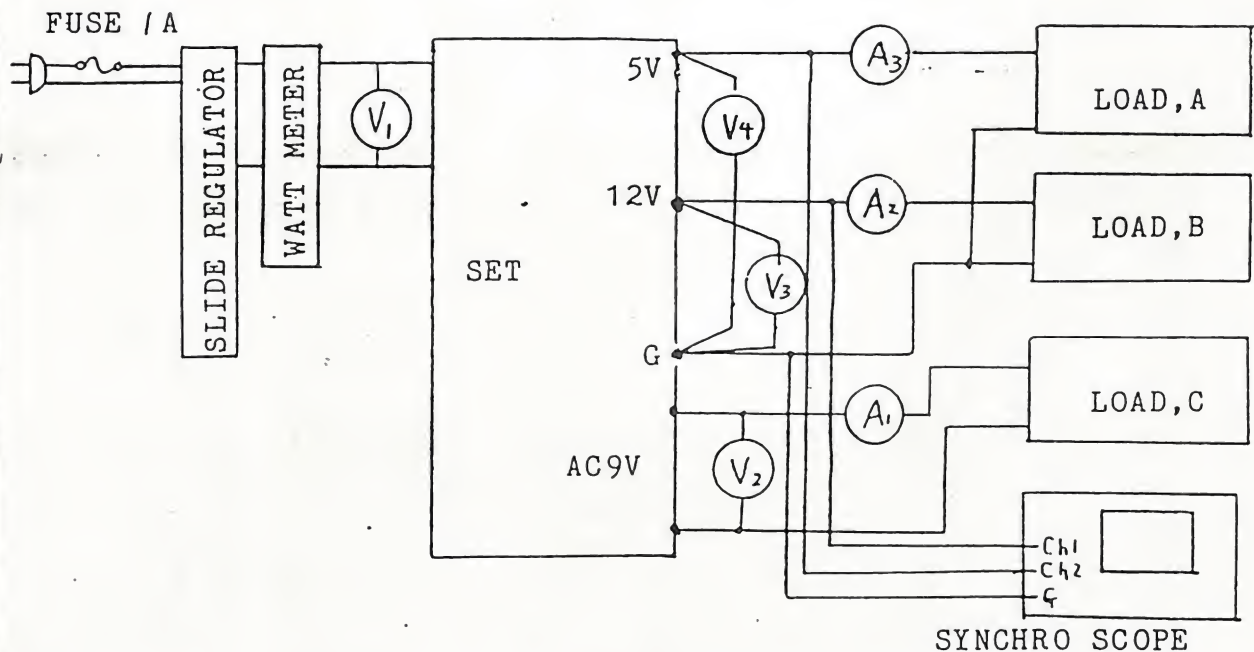
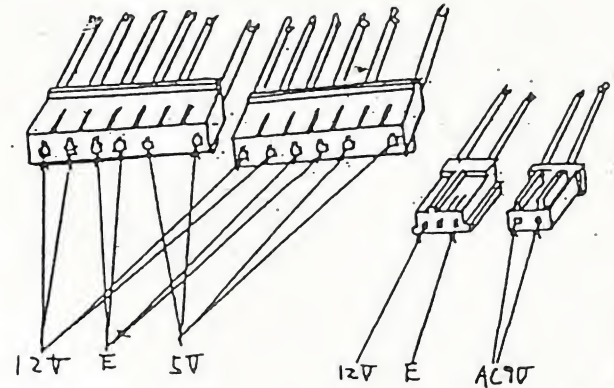
INPUT



IN PUT 230V 50/60Hz

CONNECT :ON

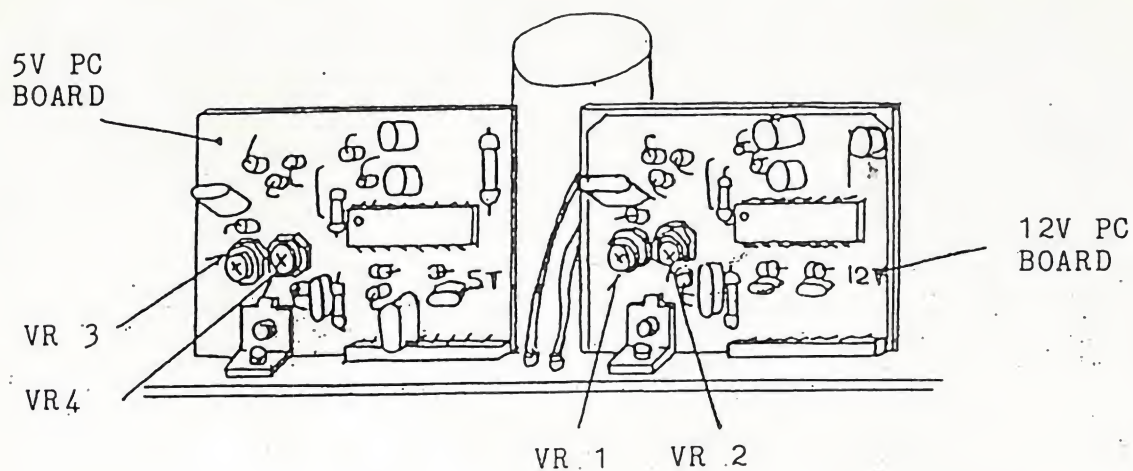
OUT PUT



- 1) SLIDE REGULATOR
- 2) WATT METER
- 3) LOAD A, B
- 4) V1
- 5) V2
- 6) V3
- 7) V4
- 8) A1
- 9) A2, 3
- 10) LOAD C


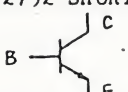

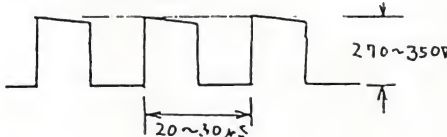
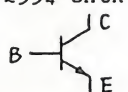
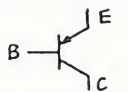

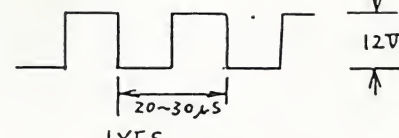
AC 220~240V  
 AC WATT MATER TYP 75W  
 ELECTRONIC LOAD TYP 12V , 5A  
 AC VOLTAGE METER TYP 120V 240V  
 AC VOLTAGE METER TYP 9V  
 DC VOLTAGE METER TYP 12V  
 DC VOLTAGE METER TYP 5V  
 AC CURRENT METER TYP 200mA  
 DC CURRENT METER TYP 3A  
 SLIDE RESISTOR TYP 45Ω





Step	Item	Remarks For Adjustment
1	Connection	Connect the SET as Per SKETCH 6
2	Volume (VR)	Turn VR1,VR2,VR3,VR4 on PC Board for 5V,12V Till the End in Clockwise Rotation
3	AC Power ON	Set Slide Reguleter at $\frac{1}{230}$ V and AC Power ON
4	Rated Current Setting	Set Circuit Loaded as Belows 1) Load A DC 5V 3.15A 2) Load B DC 12V 2.76A 3) Load C AC 9V 200mA
5	Output Voltage Adjustment	Adjust VR2 and VR4 then Set in the Range of the Following Voltage 1) DC 5V (VR4) 4.970~5.030V 2) DC 12V (VR2) 11.950~12.050V
6	Operation of Over-Current Protection and Adjustment of the Point	Adjust and Set VR1,VR3 to Operate Over-Current Protection at the Following Values 1) DC 5V (VR3) 3.6~4A 2) DC 12V (VR1) 3.6~4A



TRouble	CHECK POINT	CAUSES AND TEST	SOLUTION
NO OUTPUT	SOME SCRAP INSIDS OK	SHORT CIRCUIT BIY SCRAP YES	CLEANING
NO AC 9V OUTPUT	SUPPLEMENTARY CIRCUIT OK	T2 TRANSFORMER SHORT OR OPEN YES T2 PRIMARY LEAD WHITE TO WHITE 160~200 $\Omega$ SECONDARY LEAD RED TO RED 9~12 $\Omega$ SECONDARY LEAD BLUE TO BLUE 3.2~3.7 $\Omega$ OK	CHANGE T2
IN CASE OF REC1 SHORT FUSE IS CUT	CHECK BRIDGH DIODE OK	REC2 S1VB-10 DIODE RECTIFIED VOLTAGE DC 12~15V REC1 S3WB40 SHORT OR OPEN YES	CHANGE REC1
			
IN CASE OF Q1 SHORT FUSE IS CUT	CHECK SWITCHING TRANSISTOR OK	Q1 2SC2792 SHORT OR OPEN YES	CHANGE Q1
			
	CHECK HIGH-SPEED RECTIFY DIODE OK	D6 ESAC85-009 SHORT OR OPEN YES	CHANGE D6
			
12V CONTROL CIRCUIT		CHECK BETWEEN COLLECTOR AND EMITTER OF 2SC2792 IN Q1 BY SYNCHRO-SCOPE NO	CHANGE A BOARD OF 12V CONTROL
			
		YES 12V OUTPUT ADJUSTMENT SHIFT YES	RE-ALIGNMENT
5V output ONLY NO OUTPUT	CHECK SWITCHING TRANSISTOR OK	Q3 2SC2334 SHORT OR OPEN YES	CHANGE Q3
			
	CHECK DRIVE TRANSISTOR OK	Q4 2SA1020-0orY SHORT OR OPEN YES	CHANGE Q4
			
	CHECK HIGH-SPEED RECTIFY DIODE OK	D7 ESAC82-004 SHORT OR OPEN YES	CHANGE D7
			
5V CONTROL CIRCUIT		CHEC BETWEEN EMITTER OF 2SC2334 AND GRUND IN Q4 BY SYNCHRO-SCOPE NO	CHANGE A BOARD OF 5V CONTROL
			
		YES 5V OUTPUT ADJUSTMENT SHIFT YES	RE-ALIGNMENT

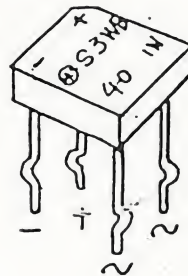
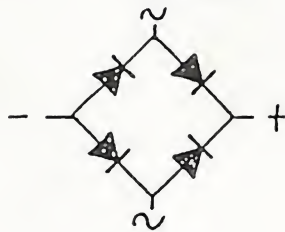


5, SEMICONDUCTOR OUTSIDE APPEARANCE

1, REC1

S3WB 60

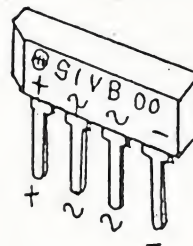
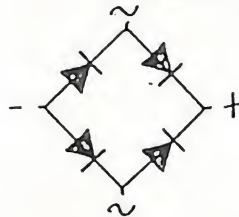
RECTIFIER STACKS DIODES



2, REC2

S1VB10

RECTIFIER STACKS DIODES



3, D1

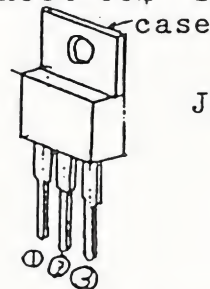
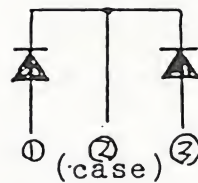
ERB28-08

FAST RECOVERY DIODES



4, D6,7

ESAC85-009 , ESAC82-004 SCHOTTKY BARRIER DIODES

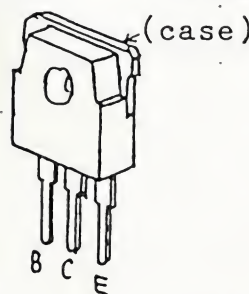
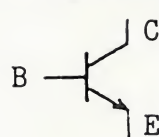


JEDEC:TO-220AB

5, Q1

2SC2C2792or3351

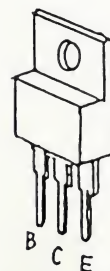
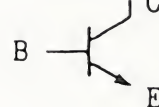
POWER TRANSISTOR



6, Q3

2SC2334 (case)

POWER TRANSISTOR  
C (case)



JEDEC:TO-220AB



7, Q4

2SA1012

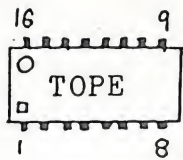
TRANSISTOR



8, IC1,2

MB3759

INTEGRATED CIRCUITS





Symbol	Part, No	Part Name	Description	Safety Part	Service Part
C21	68-0343F	CEE102A10V	CEE CAPACITOR		
C22	68-2701K	CMP224A63K-N	CMP CAPACITOR		
C23	68-27080	CPS104A50K-N	CPS CAPACITOR		
C24	68-0343F	CEE102A10V	CEE CAPACITOR		
C25	68-27080	CPS104A50K-N	CPS CAPACITOR		
C27	68-0341E	CEE479A50V	CEE CAPACITOR		
C28	68-2708I	CPS103A50K-N	CPS CAPACITOR		
C29	68-0341F	CEE100A50V	CEE CAPACITOR		
C30	68-2708F	CPS332A50K-N	CPS CAPACITOR		
C31	68-0341E	CEE479A50V	CEE CAPACITOR		
C32	68-2708I	CPS103A50K-N	CPS CAPACITOR		
C33	68-27080	CPS104A50K-N	CPS CAPACITOR		
C34	68-0341E	CEE479A50V	CEE CAPACITOR		
C36	68-2811G	CC472A2500Z	CC CAPACITOR		
C37	68-2811G	CC472A2500Z	CC CAPACITOR		
C40	68-0341F	CEE100A50V	CEE CAPACITOR		
C41	68-27080	CPS104A50K-N	CPS CAPACITOR		
RESISTORS					
Part Name.with RD:Carbon Resistor					
Part Name.with SRM:Metal Oxide Film Resistor					
R1	68-2503K	8D-13	POWER SHERMISTOR	!	0.5%
R2	68-4951Y	SRM15K-J3A	SRM RESISTOR	!	
R3	68-4943Y	SRM100-J2A	SRM RESISTOR	!	
R4	68-0332Y	RD22-J1/2A	RD RESISTOR	!	
R5	68-4937A	SRM10-J1A	SRM RESISTOR	!	
R9	68-4937A	SRM10-J1A	SRM RESISTOR	!	
R10	68-4937A	SRM10-J1A	SRM RESISTOR	!	
R11	68-0353A	MANGANEN WIRE			
R12	68-0299V	RD30K-J1/4D	RD RESISTOR		
R13	68-0298M	RD1K-J1/4D	RD RESISTOR		
R14	68-0299C	RD4.7K-J1/4D	RD RESISTOR	!	
R15	68-0298R	RD1.6K-J1/4D	RD RESISTOR	!	
R16	68-0297S	RD150-J1/4D	RD RESISTOR		
R17	68-0280S	RD820-J1/4B	RD RESISTOR		
R18	68-4937A	SRM10-J1A	SRM RESISTOR		
R19	68-0299V	RD30K-J1/4D	RD RESISTOR		
R20	68-0353A	MANGANEN WIRE			
R21	68-0298M	RD1K-J1/4D	RD RESISTOR		
R22	68-0298Y	RD3.3K-J1/4D	RD RESISTOR		
R24	68-0298V	RD2.4K-J1/4D	RD RESISTOR		
R25	68-0281K	RD4.7K-J1/4B	RD RESISTOR	!	
R26	68-0281S	RD10K-J1/4B	RD RESISTOR	!	
R27	68-0300Y	RD470K-J1/4D	RD RESISTOR	!	
R30	68-0299Q	RD18K-J1/4D	RD RESISTOR		
R31	68-0299G	RD6.8K-J1/4D	RD RESISTOR		
R32	68-0300I	RD100K-J1/4D	RD RESISTOR		
R33	68-4937A	SRM10-J1A	SRM RESISTOR		
R34	68-0298S	RD1.8K-J1/4D	RD RESISTOR		
R35	68-0281M	RD5.6K-J1/4B	RD RESISTOR		
R36	68-0281M	RD5.6K-J1/4B	RD RESISTOR		
R37	68-0300I	RD100K-J1/4D	RD RESISTOR		
R38	68-0299V	RD30K-J1/4D	RD RESISTOR		
R40	68-0299M	RD12K-J1/4D	RD RESISTOR		
R41	68-0298A	RD330-J1/4D	RD RESISTOR		

変換番号



## /0, PARTS LIST

Symbol	Part, No	Parts Name	Description	Safety Parts	Service Parts
TRANSFORMERS & COILS					
T1	68-4090A	SWITCHING TRANSFORMER		!	0.5%
T2	68-1110A	SUB POWER TRANSFORMER			
T3	68-0854A	DRIVE TRANSFORMER			
L1	68-1606D	UF2327F	LINE FILTER CHORKE		
L2	68-1366D	SKU-33-B8	CHORKE COIL		
L3	68-0306A	5MH	CHORKE COIL		
L4	68-0013B	FN-R8S	CHORKE COIL		
L5	68-1351A	SK11-2-100	CHORKE COIL		
L6	68-0306A	5MH	CHORKE COIL		
TRANSISTORS & DIODES					
Symbol No.with Q:Transistor		Symbol No.with REC:Diode			
Symbol No.with D:Diode					
Q1	68-2056F	2SC2792or3551	SWITCHING TRANSISTOR	!	0.5%
Q3	68-0040C	2SC2334-K	SWITCHING TRANSISTOR		0.2%
Q4	68-2001A	2SA1020-0,Y	TRANSISTOR		0.1%
REC1	68-0345F	S3WB-60	DIODE		0.1%
REC2	68-2254A	S1VB-10	DIODE		0.1%
D1	68-2034C	ERB28-08	DIODE		0.1%
D6	68-0035D	ESAC-85-009	DIODE		0.1%
D7	68-0035B	ESAC-82-004	DIODE		0.1%
ICs					
IC1	68-1912A	MB3759	IC	!	0.1%
IC2	68-1912A	MB3759	IC	!	0.1%
CAPACITORS					
Part Name.with CC:Ceramic Capacitor					
Part Name.with CMP:Metallized Polyester Film Capacitor					
Part Name.with CPS:Polyester Film Capacitor					
Part Name.with CEE:Aluminum Electolytic Capacitor					
C1	68-2712I	CMP224A250K-N	CMP CAPACITOR	!	
C2	68-2811D	CC102A2500K	CC CAPACITOR	!	
C3	68-2811D	CC102A2500K	CC CAPACITOR	!	
C4	68-2811E	CC222A2500M	CC CAPACITOR	!	
C5	68-2811E	CC222A2500M	CC CAPACITOR	!	
C6	68-2712G	CMP104A250M	CMP CAPACITOR	!	
C7	68-2610D	CEE221D400R	CEE CAPACITOR	!	
C8	68-2709S	CMP104A630K-N	CMP CAPACITOR	!	
C9	68-2812A	CC221A1000K	CC CAPACITOR	!	
C11	68-0341R	CEE101A35V	CEE CAPACITOR		
C12	68-2814D	CC222A2000K	CC CAPACITOR		
C13	68-2814D	CC222A2000K	CC CAPACITOR		
C14	68-2610B	CEE472D25Q	CEE CAPACITOR		
C15	68-2701K	CMP224A63K-N	CMP CAPACITOR		
C16	68-2708D	CPS104A50K-N	CPS CAPACITOR		
C17	68-0342R	CEE222A16V	CEE CAPACITOR		
C18	68-2708D	CPS104A50K-N	CPS CAPACITOR		
C19	68-0342S	CEE332A16V	CEE CAPACITOR		



Symbol	Part, No	Part Name	Description	Safety Part	Service Part
R42 R45 R50	68-0300I 68-0299A 68-0336U	RD100K-J1/4D RD3.9K-J1/4D RD330K-J1/2A	RD RESISTOR RD RESISTOR RD RESISTOR	!	
SEMI FIXED RESISTOR					
VR1 VR2 VR3 VR4	68-0119B 68-0119F 68-0119B 68-0119F	RGS6-FAN500 RGS6-FAN1K RGS6-FAN500 RGS6-FAN1K		!	0.2% 0.2% 0.2% 0.2%
MISCELLANEOUS					
M1 M2 M3 M4 M5 M6	68-4114A 68-4115A 68-4505A 68-4505B 68-4505C 68-4505D	PC BOARD (A) PC BOARD (B) 1/2 JOINT P=7.5mm JOINT P=10mm JOINT P=12.5mm JOINT P=15mm		!	
M6 M7 M8 M9 M10 M11 M12	68-3521F 68-3514C 68-3516A 68-3519A 68-3519A 68-3517A 68-4003L	ANGLE PLUG, M34-09-30-134P PLUG, 5285-04A CONNECTOR 2P ASS CONNECTOR 6P ASS CONNECTOR 6P ASS CONNECTOR 3P ASS TUBING (UL)		!	0.2% 0.2% 0.2% 0.2% 0.5%
MECHANICAL PART					
M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23	68-5086A 68-5087A 68-5082A 68-0026B 68-0352A 68-0076A 68-0025A 68-5078A 68-0061A 68-5083A 68-5088A	RADIATOR (A) RADIATOR (B) RADIATION SEAT (SARCON 45F) RADIATION SEAT TO-220 (SARCON 45F) RADIATION SEAT TO-3P (SARCON 45F) BUSHING BUSHING (C) BAND (KM-85) L ANGLE SIIRUDO PLATE LABEL		! ! ! !	0.2% 0.5%
SCREWS					
M24 M25 M26 M27 M28 M29	68-5800C 68-5800D 68-0015E 68-5802B 68-5802D 68-5089A	BIND HEAD 3.0×6mm BIND HEAD 3.0×8mm BIND HEAD 3.0×6mm (SUS) W-SEMS 3.0×6mm W-SEMS 3.0×10mm NYLON RIVET			
PCB ASS					
12V 5V	68-5100 68-5099	12V PC BOARD ASS 5V PC BOARD ASS		!	0.2 0.2
<div>受取番号</div>					



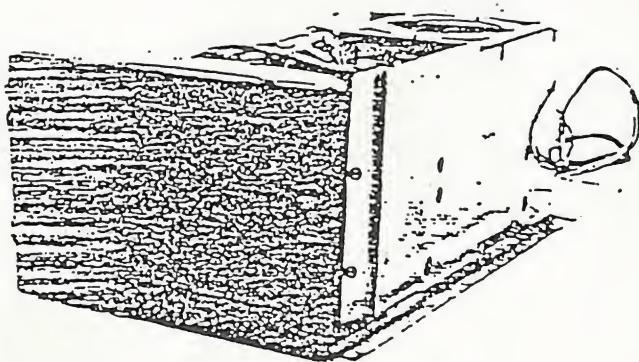
# Commodore

## SERVICE MANUAL

MODEL

25062 2-02

5" COLOR VIDEO MONITOR



No. 5463  
Sept. 1983



# CONTENTS

SPECIFICATIONS .....	2
1. SAFETY PRECAUTION FOR MONITOR .....	3
2. SERVICE ADJUSTMENT .....	4 ~ 7
3. REPLACEMENT PARTS LIST .....	8 ~ 11
[EXPLODED VIEW] .....	11
4. BLOCK DIAGRAM .....	12
* With 250622-02 SCHEMATIC DIAGRAM	

## SPECIFICATIONS

Dimensions: 16.5cm(W) x 28.0cm(D) x 11.6cm(H)

Weight: 14.4 kg

Color System ..... PAL

Horizontal resolution ..... 220 Lines

Video/Sync Input ..... 1Vp-p

Chroma Input ..... 1Vp-p

Audio input ..... 0.8Vp-p, High Impedance.

Scan frequency ..... H. 15.63 kHz, V. 50 Hz

Power input ..... DC 12V

Power Consumption ..... 1.35A(max.), 1.18A(Avg.)

Picture tube ..... 5", 55 degree deflection, In-line gun Dot screen Quick Start.

Viewable picture size ..... 7.9 cm(H) x 10.4 cm(W)

High voltage ..... 14 kV  $\pm$  1 kV (at zero beam current)

Speaker ..... 6.6cm round type, 16  $\Omega$

Audio power output ..... 0.45 W

Tube ..... 1

IC ..... 4

Transistor ..... 25

(Design and specifications subject to change without notice.)



## 2. SERVICE ADJUSTMENTS

### PURITY

1. Display a monochrome pattern.
  2. As viewed from the back (See Fig. 2-1), turn the magnet lock counter-clockwise to loosen it.
  3. Turn the green cutoff VR (R707) fully clockwise and the red and blue cutoff VRs (R704, R701) fully counter-clockwise. (Fig. 2-8)  
Adjust the screen VR (Fig. 2-8) so that the vertical green band becomes easy to see.
  4. Loosen the deflection yoke securing screw and slide the yoke fully rearward to obtain color shading in the green disk.
  5. Overlap the two purity magnet tabs and set them to 12 o'clock position.
  6. Open and close the two purity magnets (scissor fashion) and adjust so that the green disk is positioned at the centre of the picture.
- If green disk is not obtained, adjust for uniform overall coloration.
7. Slide the deflection yoke forward and adjust its position so that the green color completely fills the picture area.
  8. Confirm that uniform overall rasters of both red and blue single color rasters can also be obtained in the same manner.
  9. Secure the deflection yoke retaining screw moderately so that the deflection yoke does not move back and forth.

### STATIC CONVERGENCE (CENTER)

1. Employ a crosshatch pattern and adjust the brightness so that the image is clear, but slightly darkened.
2. Turn the red and blue cutoff VRs fully clockwise and the green cutoff VR fully counter-clockwise (Fig. 2-8). Adjust the screen VR (Fig. 2-8) for an easily seen image.
3. Adjust convergence roughly in the corner by tilting the deflection yoke vertically or horizontally, then insert a wedge between the yoke and CRT on top.
4. Turn the two 4 pole convergence magnets and adjust so that red and blue become overlapped throughout the picture area to yield magenta. (Fig. 2-4)
5. Turn the green cutoff VR full clockwise and adjust the two 6 pole convergence magnets so that the green and magenta become overlapped throughout the picture area to yield white. (Fig. 2-5)
6. Repeat steps 4 and 5.

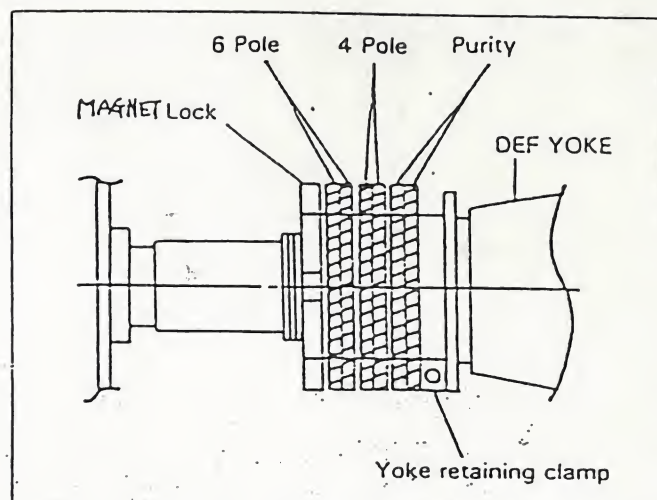


Fig. 2-1

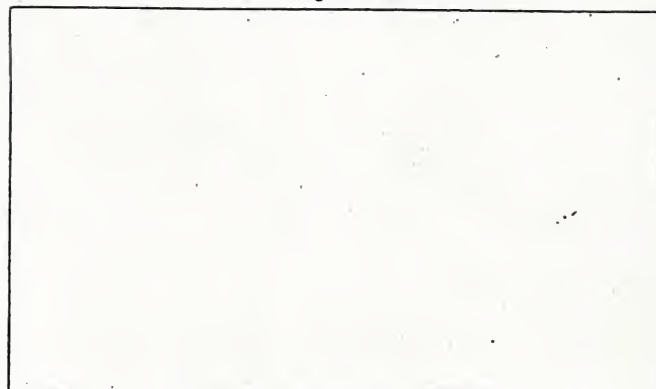


Fig. 2-2

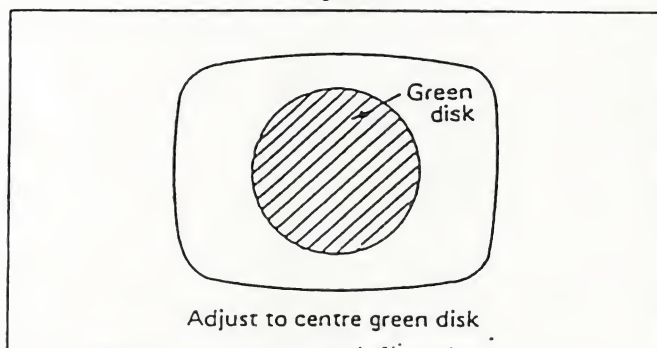


Fig. 2-3

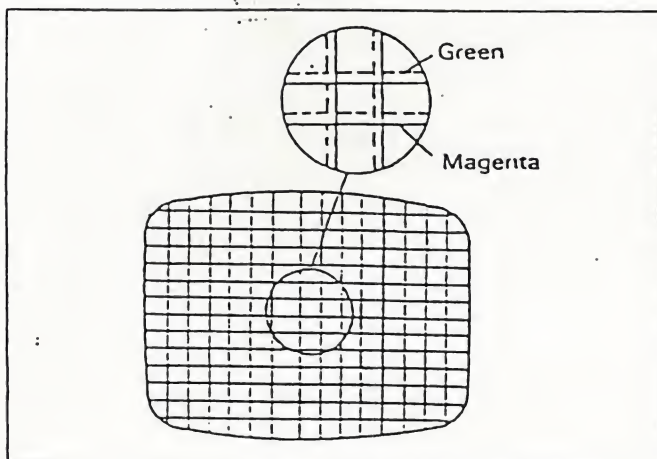



Fig. 2-4



# 1. SAFETY PRECAUTION FOR MONITOR

1. The design of this product contains special hardware, many circuits and components specially for safety purposes.  
For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of receiver should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in television sets have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (  ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. If any repair has been made to the chassis, it is recommended that the B<sub>1</sub> setting should be checked or adjusted (See ADJUSTMENT OF B<sub>1</sub> VOLTAGE).
5. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
6. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k $\Omega$  2W resistor to the anode button.

7. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

## 8. ISOLATION CHECK (SAFETY FOR ELECTRICAL SHOCK HAZARD)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, channel selector knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

### (1) DIELECTRIC STRENGTH TEST

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1,100 V AC (r.m.s.) for a period of one second.

This method of test requires a test equipment not generally found in the service trade.

### (2) LEAKAGE CURRENT CHECK

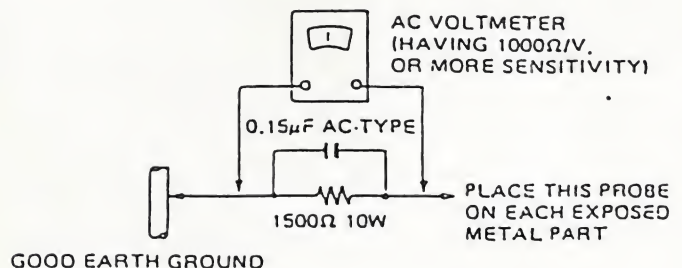
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.) Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).

### • ALTERNATE CHECK METHOD

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 $\Omega$  10W resistor paralleled by a 0.15 $\mu$ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.).

Measure the AC voltage across the resistor with the AC voltmeter.

Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.35V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).





## DYNAMIC CONVERGENCE (CONER)

1. Remove the wedge.
2. Adjust convergence as shown in Fig. 2-7 by tilting the yoke up and down; then insert the wedges on top and bottom.
3. Apply (modeler's) glue on the wedges and magnets to fix.
4. Tighten the screw of the deflection yoke.
5. Turn the magnet lock and tighten securely.

## WHITE BALANCE

1. Display a monochrome pattern.
2. After switching the cut off service SW. to SERVICE, short TP-35A and TP-35B with a jumper wire, and then display a single horizontal line.
3. Turn the red, blue and green cutoff VRs (R704, R701, R707) and the screen VR (Fig. 2-8) fully counter-clockwise to eliminate luminance.
4. Gradually turn the screen VR clockwise to where single line of one of the colors appears.
5. Turn the cutoff VR of this color clockwise about 10 degrees.
6. Again turn the screen VR so that this color appears only faintly.
7. Adjust the other cutoff VRs so that the horizontal line becomes white.
8. After removing a jumper wire which are shorted at step 2), return the cut off service SW. to NORMAL and then display a monochrome pattern.
9. With a dark picture, perform fine adjustment to obtain optimum white balance.
10. With a bright picture, adjust the red and green drive VRs for optimum white balance.

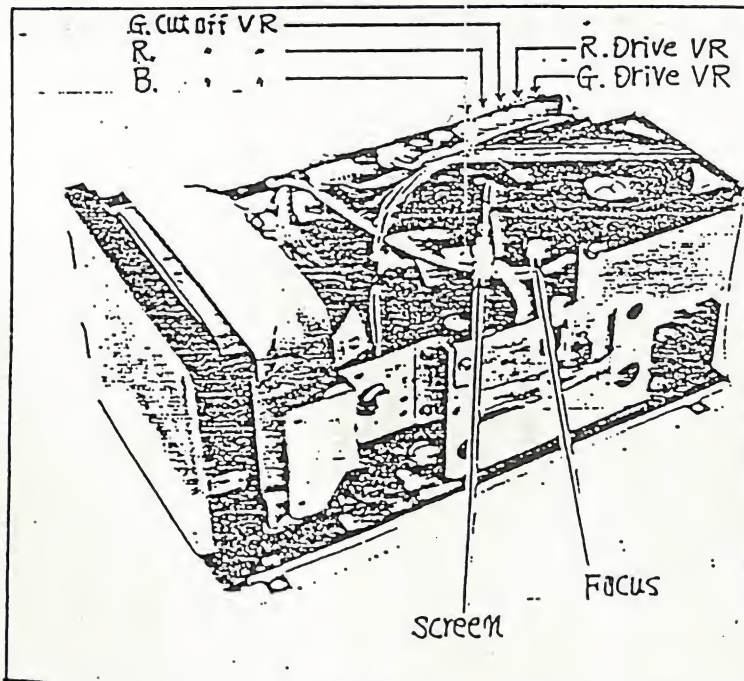


Fig. 2-8

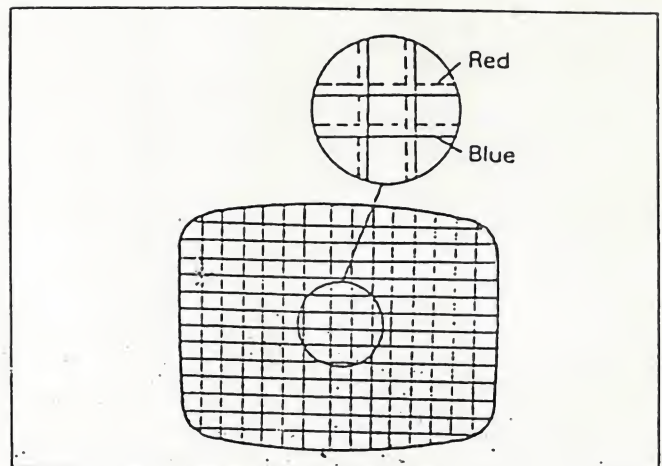


Fig. 2-5

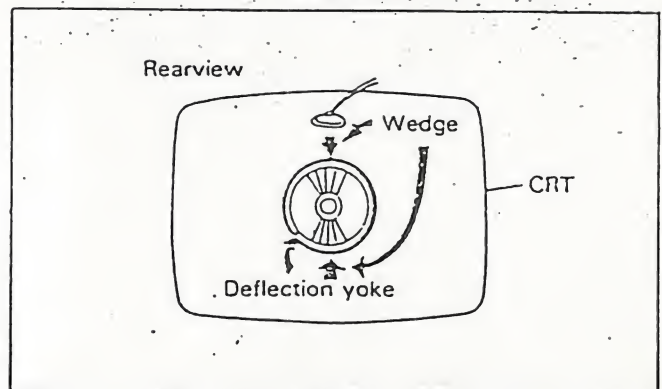


Fig. 2-6

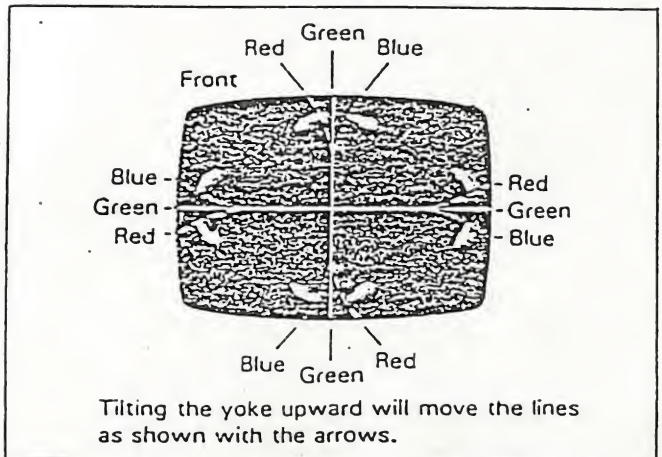
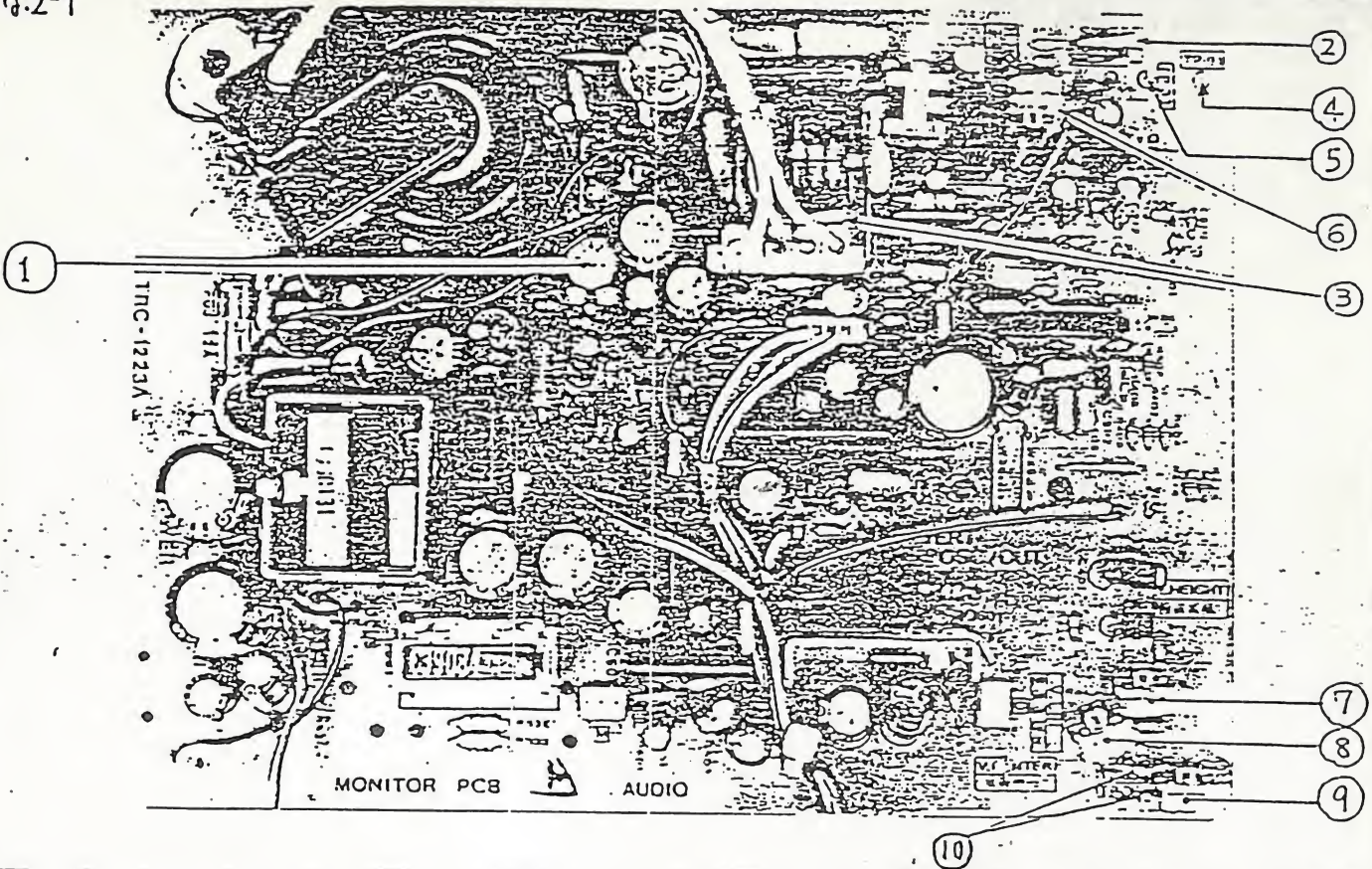


Fig. 2-7

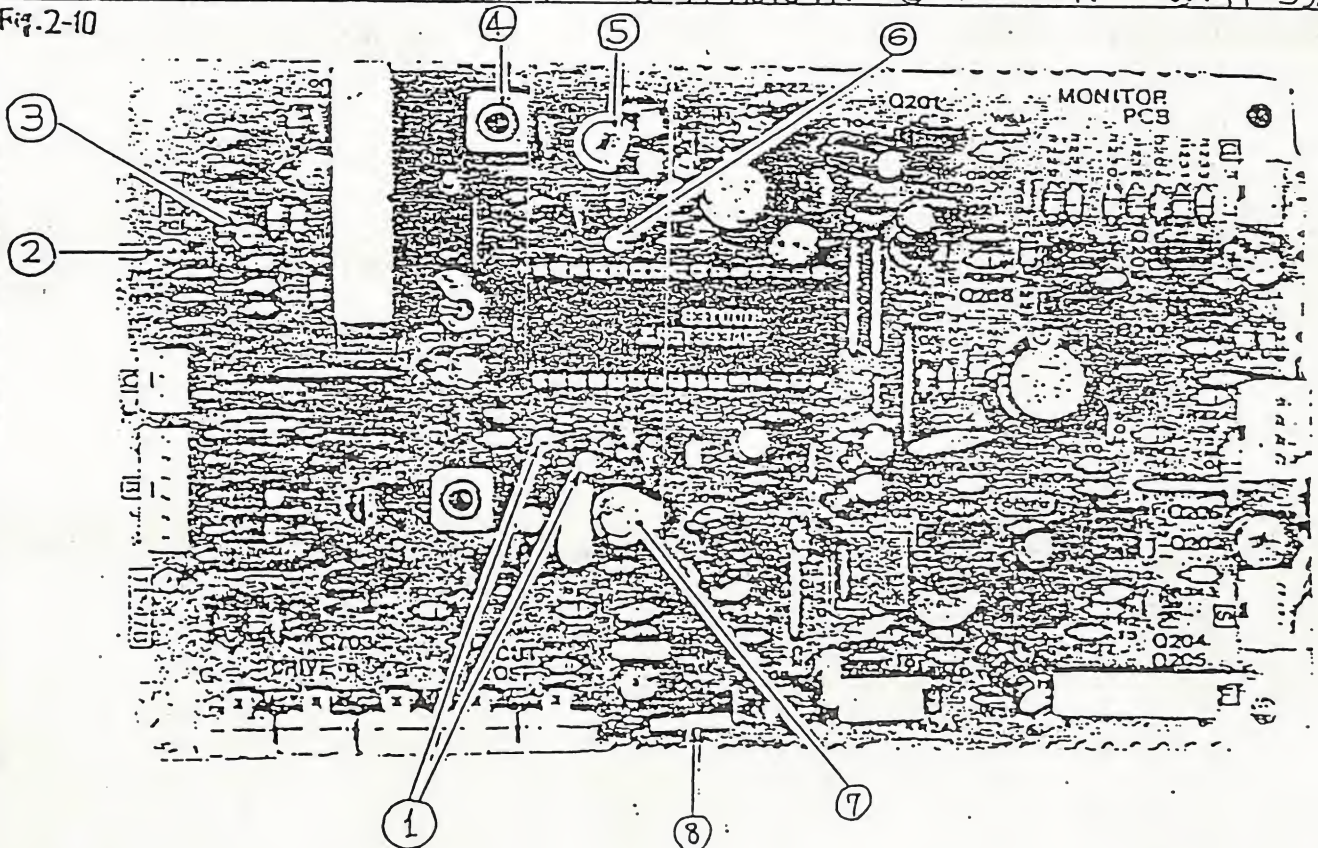


Fig.2-9



- |                 |              |              |                |                |
|-----------------|--------------|--------------|----------------|----------------|
| ①: B1 ADJ. VR   | ③: H.Center  | ⑤: TP-33     | ⑦: V.Height VR | ⑨: V.Center VR |
| ②: Sub.H.Center | ④: TP-91(B1) | ⑥: H.Held VR | ⑧: V.Lim.VR    | ⑩: TP-35A/B    |

Fig.2-10



- |             |                        |             |                               |
|-------------|------------------------|-------------|-------------------------------|
| ①: TP-46A/B | ③: TP-48               | ⑤: DLAMP VR | ⑦: C324 (Trimmer)             |
| ②: TP-49    | ④: T303 (DL.P.Transf.) | ⑧: TP-45    | ⑧: S201 (Cut off Service SW.) |



## Alignment location

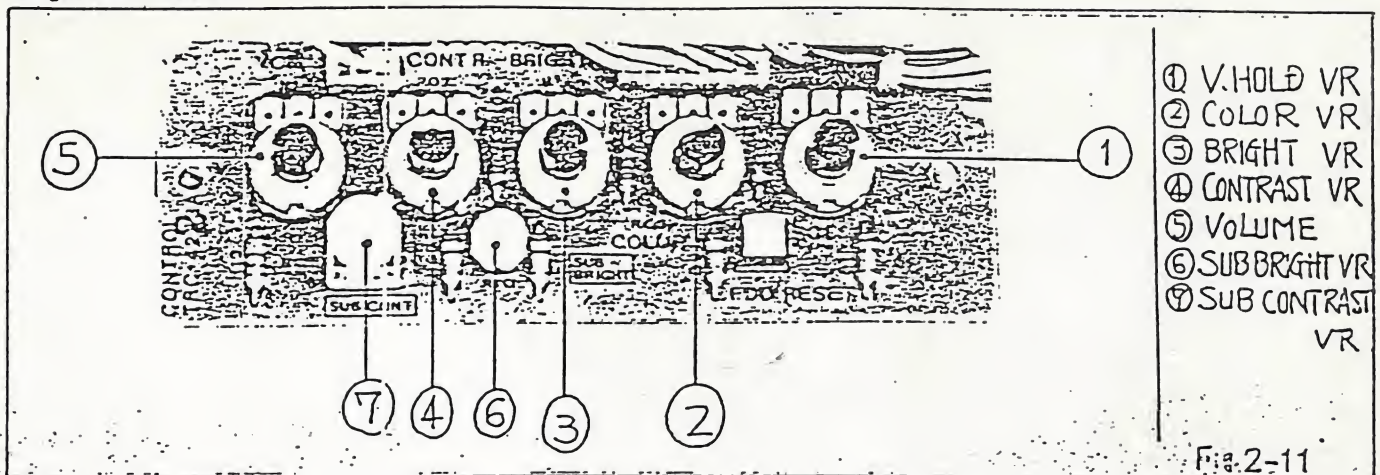


Fig. 2-11

## B<sub>1</sub> VOLTAGE (28V)

Cutoff the picture by the bright VR (R4211) and sub bright VR (R4210).

Measure the voltage between TP-91 of the def. , power reg. and Audio out PB Assy and ground. Adjust B<sub>1</sub> adj. VR (R902) to obtain 28V.

## FOCUS

Adjust the FOCUS control for best overall definition and picture detail at normal brightness and contrast.

## V. CENTER

Adjust the V. center VR (R417) to the optimum vertical picture position.

## HORIZONTAL OSCILLATOR

1. Set the H. Hold VR to the mechanical center position.
2. Connect the jumper clip between TP-33 and earth.
3. While rotating the H. Hold VR, keep the picture stationary or slowly moving.
4. Remove the jumper clip.
5. Make sure that the set maintains horizontal sync, when signals are switched.

## H. CENTER

Set the H. Center switch (S85) and Sub-H. Center switch (S86) to the optimum horizontal picture position.

## VERTICAL HEIGHT AND LINEARITY

1. Display a pattern which allows easy confirmation of symmetry (such as a circle or crosshatch).
2. Reduce the vertical size with the V. HEIGHT VR.
3. Adjust the vertical symmetry with the V. LIN. VR.
4. Readjust the vertical height, so that the picture extends to normal size.

## SUB CONTRAST AND SUB BRIGHT

1. Display a picture and set the contrast and bright VRs to the center click positions.
2. Adjust the sub contrast VR (R4206) and sub bright VR (R4210) for optimum display.

## COLOR SYNC

1. Display a color video signal and apply bias +10V to TP-45.
2. Connect a jumper clip between TP-46A and TP-46B.
3. Use a nonmetallic driver to turn trimmer capacitor C324.
4. Adjust so that the rolling color stripes become thick and the rolling slows or stops.
5. Remove jumper wire.
6. Confirm that color sync, is not disrupted when signals are switched.

## DL-MATRIX

1. Display a color video signal.
2. Set the oscilloscope to X-Y range, and connect its X-probe to TP-48 and its Y-probe to TP-49.
3. Connect a jumper clip between TP-46A and TP-46B. And apply bias +10V to TP-45.
4. Adjust the trimmer capacitor (C324) slightly so that the color becomes unlocked and the loops of the displayed lissajous figure appear on the scope. (Fig. 2-12)
5. Adjust the DL AMP control (R304) for the absence of loops and adjust the DL PHASE TRANSF. (T303) so that each pair of lines merge together.
6. Adjust the trimmer capacitor (C324) to just regain floating color synchronization.
7. Remove a jumper clip and bias +10V.

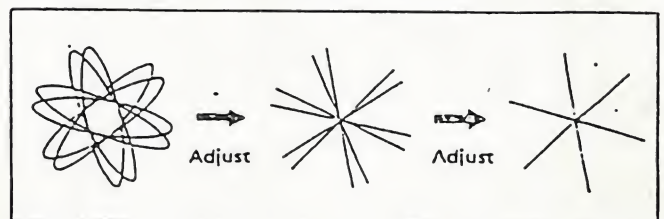


Fig. 2-12







## TRC-1223A-1 (VIDEO &amp; CHROMA PCB ASS'Y) 1/2

250622-82

SYMBO No.	Δ	PART No.	PART NAME.	REMARK
VARIABLE RESISTOR				
R1304		CEX40053-053	VR(DL AMP)	5kΩ B
1701		A75557-103	" (B. CUT OFF)	10kΩ "
1704		" -103	" (R. CUT OFF)	" "
1706		" -221	" (R. DRIVE)	220Ω "
1707		" -103	" (G. CUT OFF)	10kΩ "
1709		" -221	" (G. DRIVE)	220Ω "
RESISTOR				
R1710		QRG019J-123S	0 M R	12kΩ 1W J
1712		" -123S	"	" " "
1714		" -123S	"	" " "
CAPACITOR				
C1305		QEB51HM-224M	E Cap.	0.22μF 50V M
1324		QAT3001-010	Trimmer Cap.	"
COIL				
L1201		A76186-1.5	Peaking Coil	1.5μH
1202		A49468-562	"	5600μH
1203		" -101	"	100μH
1301		A76186-8.2	"	8.2μH
1302		" -68	"	68μH
TRANSFORMER				
T1302		CE40395-001	CW. Transf.	
1303		CE40396-001	DL P Transf.	
DIODE				
D1201		1SS133	Si. Diode	
~5				







## TRC-1223A-2 (DEF. POWER REG. &amp; AUDIO OUT PCB ASSY) V3

SYM EQL No.	△	PART No.	PART NAME.	REMARK
VARIABLE RESISTOR				
R1409		QVZ3507-223	VR (V. HEIGHT.)	22k $\Omega$ B
1413		" -222	" (V. LIN.)	2.2k $\Omega$ "
1417		" -102	" (V. CENT.)	1k $\Omega$ "
1508		A75557-222	" (H. HOLD)	2.2k $\Omega$ "
1902		CEX40054-023	" (B1 ADJ)	2k $\Omega$ "
RESISTOR				
R1917		QRG019J-152S	OMR	1.5K $\Omega$ 1W J
-1926		QRM024K-R22	MPR	0.22 $\Omega$ 2W K
CAPACITOR				
C1401		QENG1HM-105Z	BPE Cap.	1 $\mu$ F 50V M
1404		QEN51HM-105	"	" " "
1405		QFZ0083-104M	M. Cap.	0.1 $\mu$ F " K
1408		QEE51EK-105B	Tan. Cap.	1 $\mu$ F 25V "
1409		QEE51AK-226M	"	22 $\mu$ F 10V "
1410		" -226M	"	" " "
1412		QEU51EM-108M	E Cap.	1000 $\mu$ F 25V M
1413		QEB51HM-224M	"	0.22 $\mu$ F 50V "
1509		QFP31HJ-562S	PP Cap.	5600pF " J
1515	△	QFP42JJ-562S	"	" 630V "
1516	△	" -472M	"	4700pF " "
1517	△	" -472M	"	" " "
1518		QFH52AJ-155M	M.M Cap.	1.5 $\mu$ F 100V "
1519		QFP32DK-473M	PP Cap.	0.047 $\mu$ F 200V K
1520		" -473M	"	" " "
1528		QENG1HM-474Z	BPE Cap.	0.47 $\mu$ F 50V M
1601		QEN51HM-105	"	1 $\mu$ F " "



## TRC-1223A-2 (DEF. POWER REG. &amp; AUDIO OUT PCB ASS'Y) 3/3

SYMBOL No.	△	PART No.	PART NAME.	REMARK
COIL				
L1501		CE40024-002	Hor. Lin.	
1503		CJ30030-054	Coil	
1522		CE40140-000	W Coil	
1901		CJ30131-00A	Power Choke	
TRANSFORMER				
T1501		A76568-MA	H. Drive Transf.	
1502	△	CJ39587-00A	F. B. Transf.	
1531		C39084-A	Side Pin Transf.	
1901		A76567-MA	P. Drive Transf.	
DIODE				
D1501		HZS6.8E(B2)	Zener Diode	
1502		V19E	Si. Diode	
1504		V09E	"	
~7				
1508		U19B(V)	"	
1601		HZS10E(B3)	Zener Diode	
1902		U19B	Si. Diode	
1903		HZS6.8E(B2)	Zener Diode	
1904		HZS12E(B)	"	
1905		HZS6.8E(B2)	"	
1906		1SS133	Si. Diode	
1907		HZS13E(B1)	Zener Diode	
1908		1SS133	Si. Diode	
1909		"	"	
TRANSISTOR				
Q1401		2SA1015(Y,GR)	Transistor	
1501		2SC1685	Si. Transistor	
1502		2SA817A(O,Y)	"	
1503	△	2SC2335	"	
1601		2SD1133	Transistor	







TRC-4223A (CONTROL PCB ASS'Y)

250622-02

[illegible]



# PARTS LIST

(Shaded parts in the Schematic Diagram)

250622-02 (1/1)

[illegible]

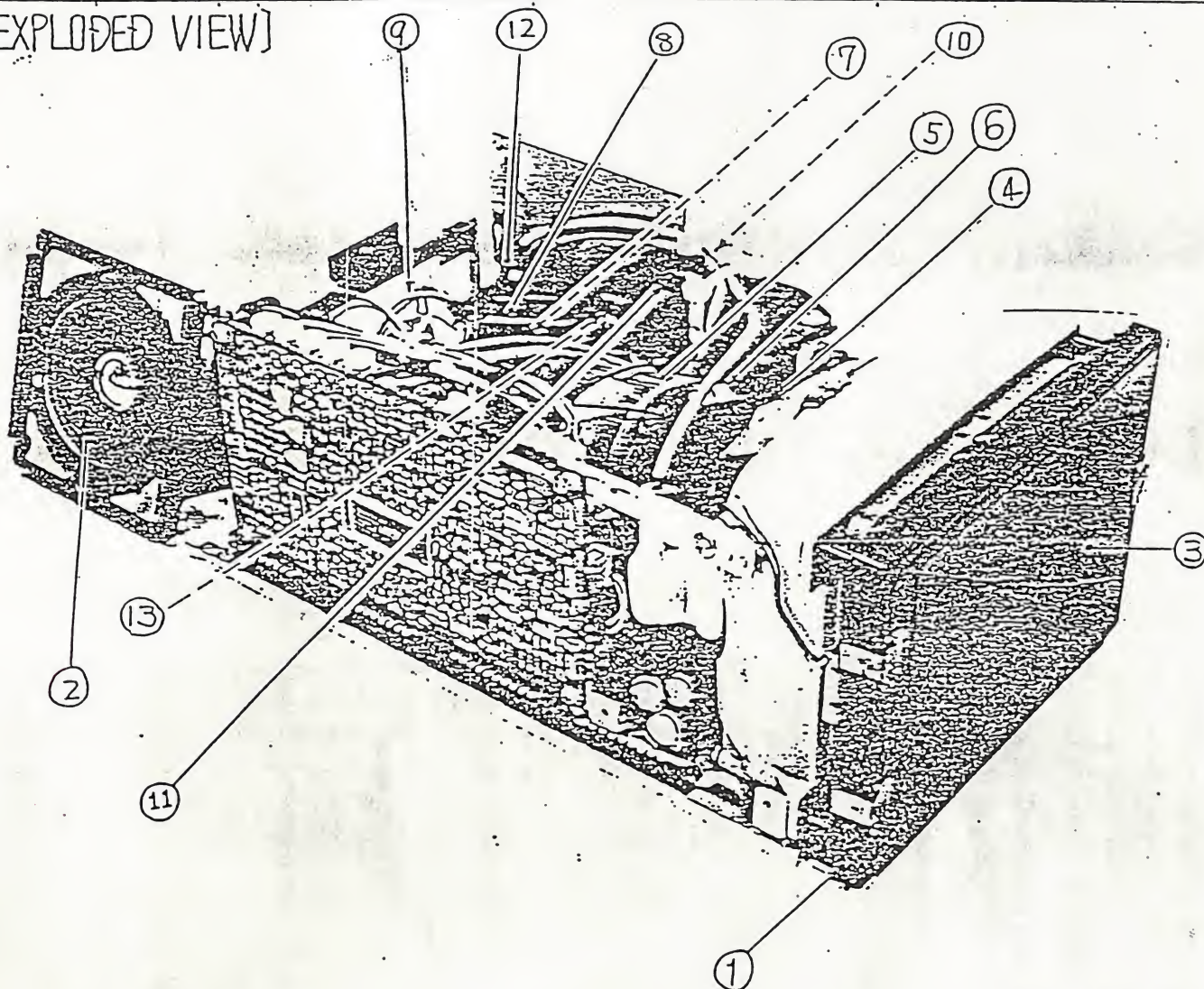
FOR HS



# CRABO AND CABINET PARTS LIST

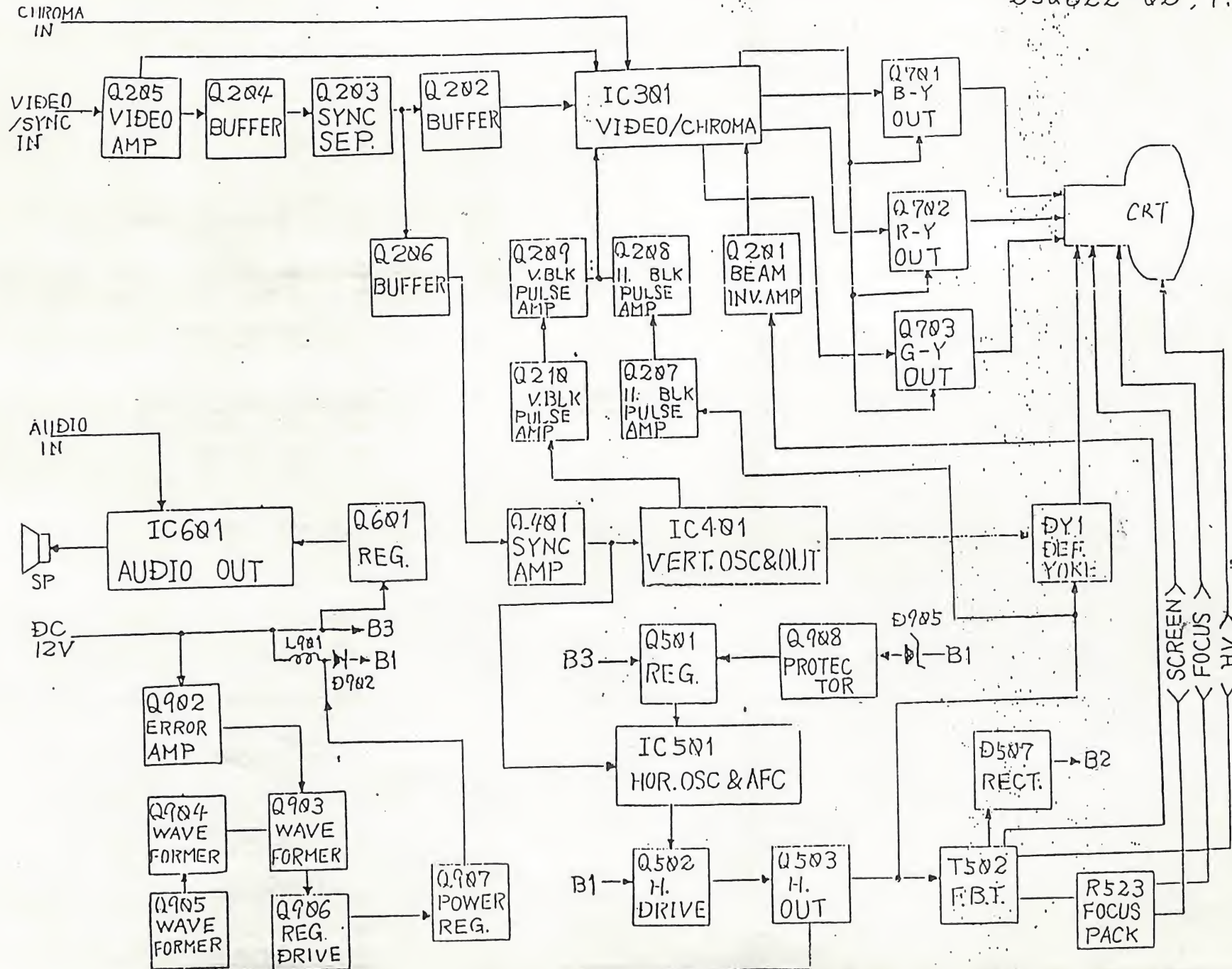
VIEW No.	SYMBOL No.	A	PART No.	PART NAME	REMARK
1			CM10022-00D	Front Panel Ass'y	
2			HSA0799-01C	Speaker	
3			CM41779-A01	Protector Glass	
4	V01	△	150BMB22-AF	Picture Tube	
5	DY1	△	CJ26210-00A	Def. Yoke	
6			—	Wedge	
7			—	PC Magnet	
8	T1502	△	CJ39587-00A	F. B. Transf.	
9		△	C39158-D	CRT Socket	
10	Q1907		2SD1118	Si. Transistor	Power regulator
11	R1523	△	CJ49510-257-28	Focus Pack	Focus Screen
12			A46445	Focus Cover	(X2)
13	C001	△	QCZ9017-102M	C Cap.	1000p - 3KV P

(EXPLODED VIEW)



(No. 5463) 11

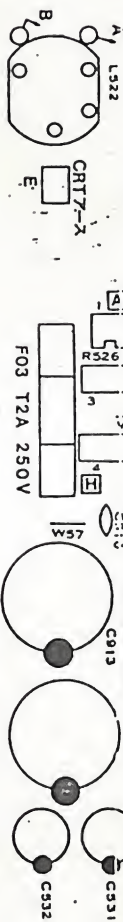






TRC-1223A

POWER



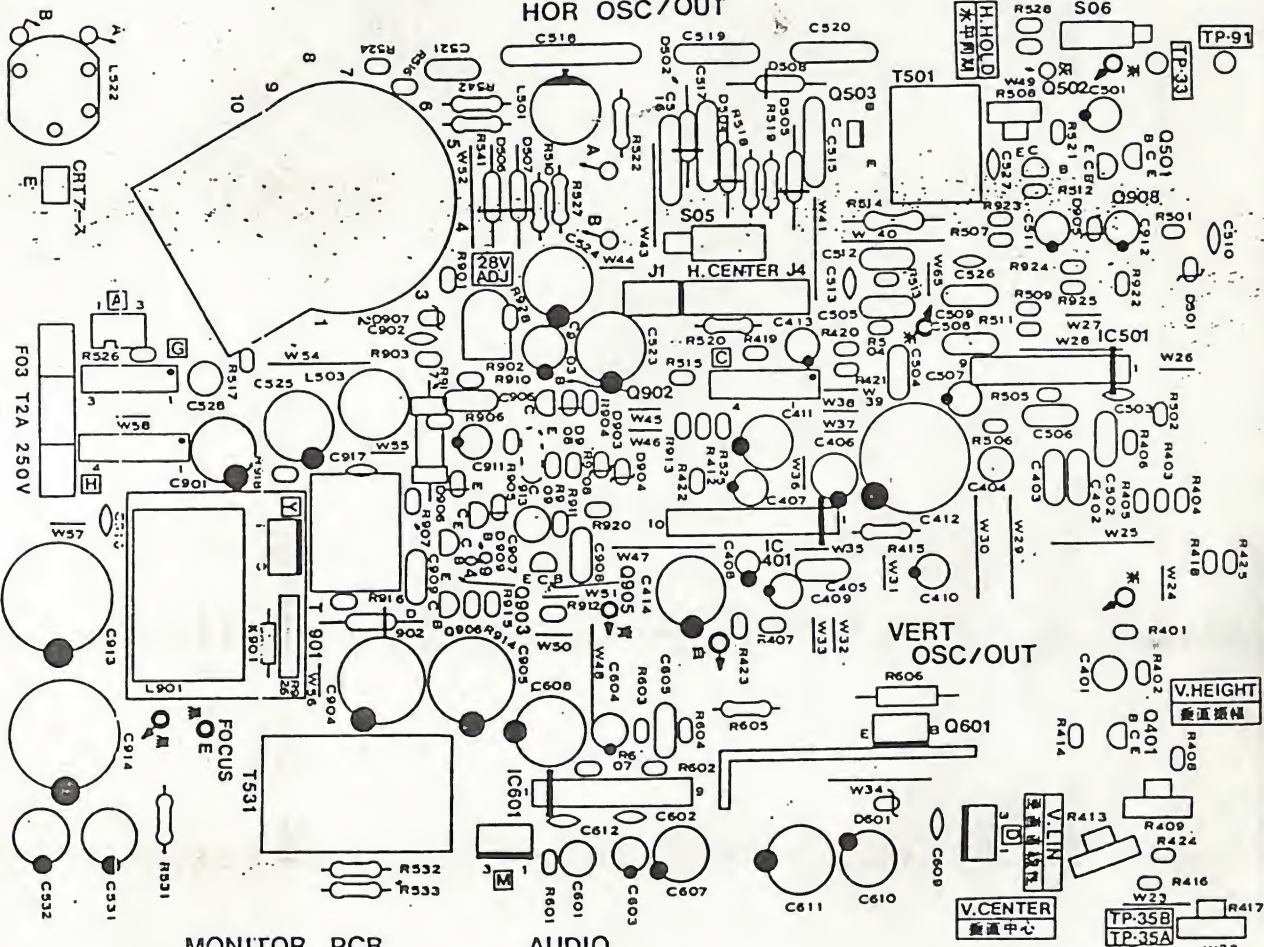
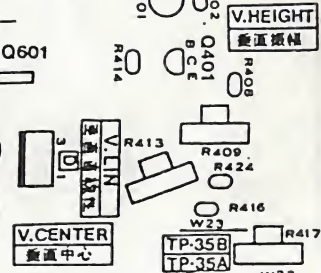
MONITOR PCB

HOR OSC/OUT

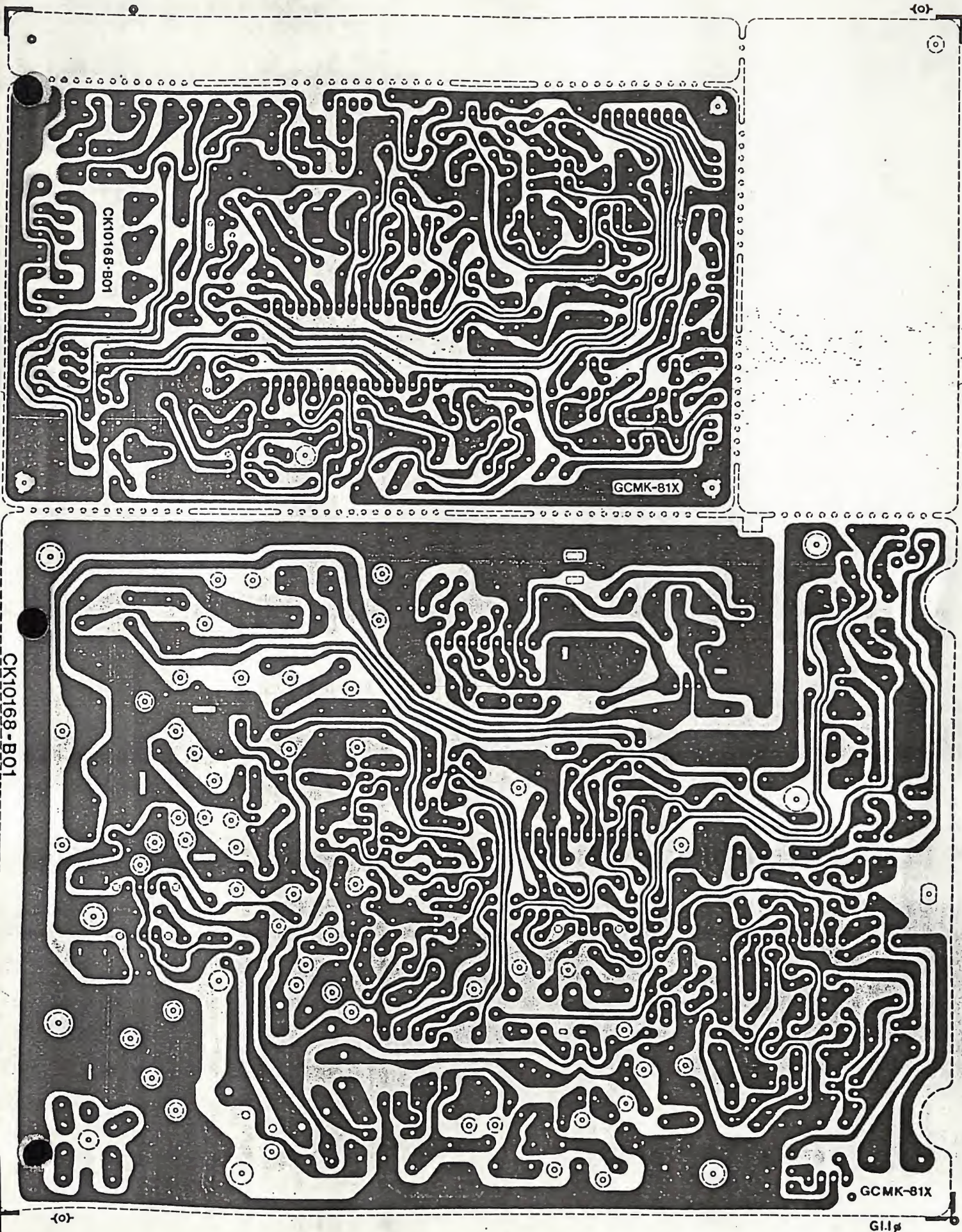
AUDIO

MONITOR PCB

VERT OSC/OUT







250622-02



